TECHNOLOGY DEPT.

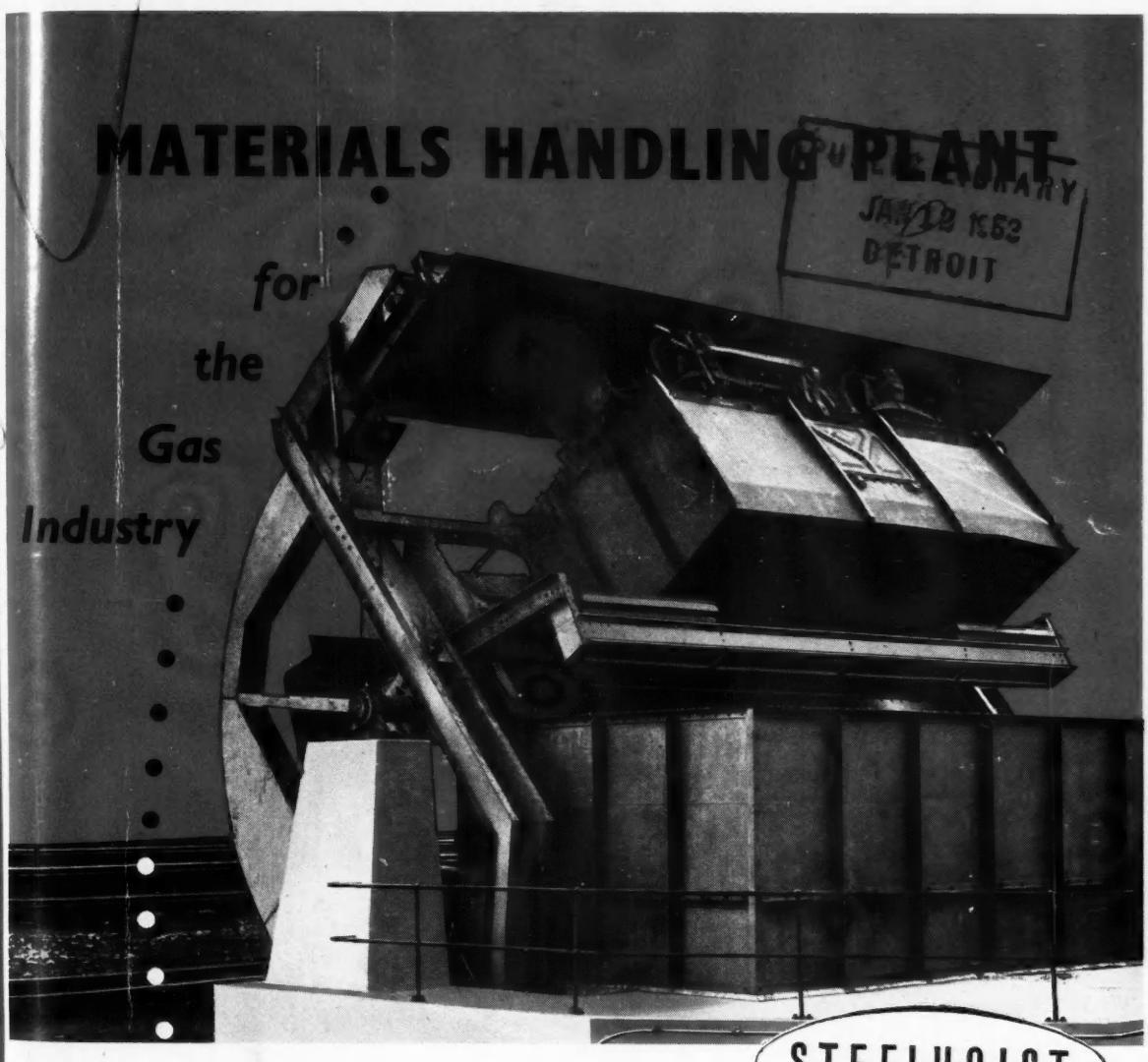
Gas Journal

Vol. 272. 104th Year. LONDON, DECEMBER 17, 1952. No. 4672. Price 1/3

Registered as a Newspaper

MATERIALS HANDLING PLANT

for the Gas Industry



THE **ROTASIDE** WAGON TIPPLER

Also Rotary and Mobile Tipplers, Tippler Hoists, Wagon Right-Anglers (for the smaller works) . . . Automatic Skip Hoists . . . Telpher Plants . . . Transporters . . . Conveyors etc.
Designed, manufactured and installed by

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STEELHOIST WORKS, BRISTOL 2 (Telephone: 77664)

PLAN *for* EFFICIENCY

Conveyors and Mechanical Handling Plant cut time and labour costs, thereby providing the extra impetus needed for increased productivity. There is no problem in this field to which we cannot supply the answer.

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JOHN THOMPSON CONVEYOR CO.

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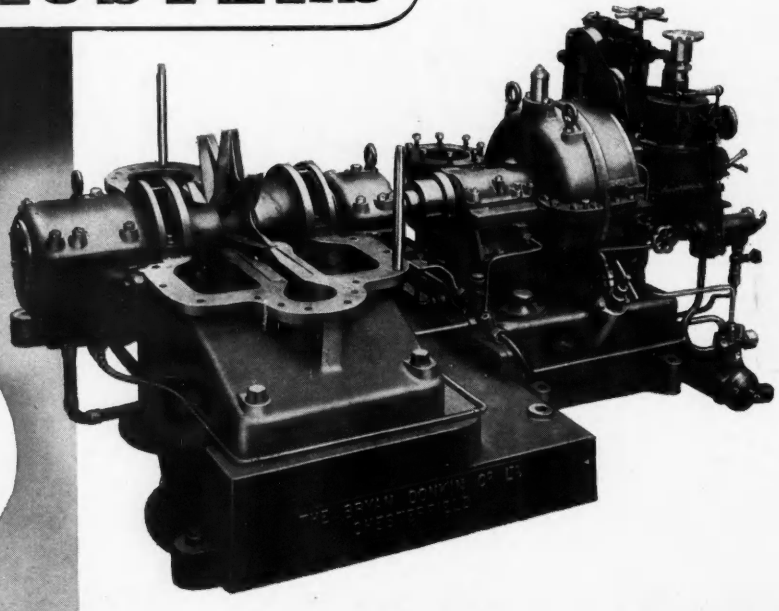
EXHAUSTERS



I.L.P. 640 Double Inlet Star Type-Fan. Capacity 10,000,000 cubic feet of Gas per day, against 72" W.G. running at 8,700 revs. per minute driven by Steam Turbine. Dimensions 6' wide 8' long, 4' high.

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WRIGHT'S Laboratory Gas and Air Meters are used by famous industrial and research organizations engaged on coal and gas processing, and in plant and appliance testing. In the field of medical science and in connection with many technological developments Wright's Meters also play an important part.

The full series covers sizes from 3-light (0.1 cu. ft./rev.) to 50-light. The 3-light size is made in brass, copper, cast-iron (illustrated) and 'V N' casings; larger sizes in brass or copper.

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Automatic stop-action Meter.

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GAS METERS

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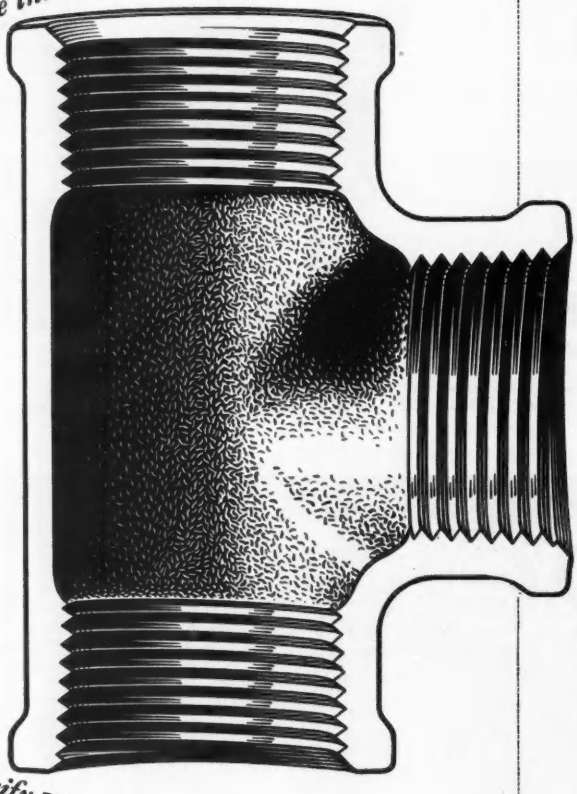
LEEDS · MANCHESTER

Product of Radiation Ltd

Malleable Iron Pipe Fittings

It's the threads that count



specify TAPER THREADS *for stronger joints*

As the largest producers in Great Britain of Malleable Iron Pipe Fittings, Crane call your attention to some special virtues. These fittings are of the banded pattern. They have taper threads. They are made to British Standard dimensions, and are individually tested. Finishes are in black and galvanised. Plain pattern fittings are also available.

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CRANE LTD., 45-51 LEMAN STREET, LONDON, E.1
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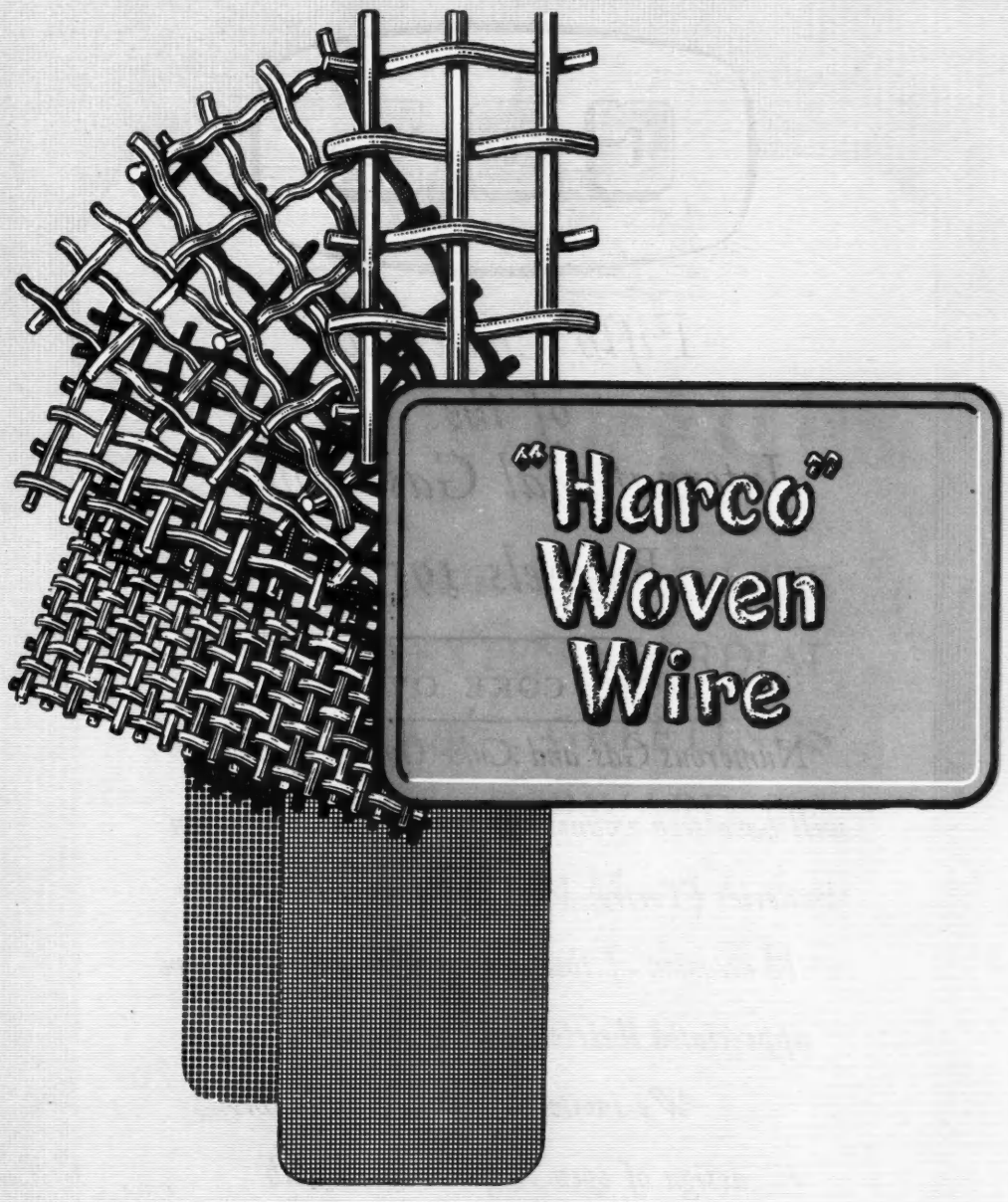

WHENEVER it is a question as to "where-to-get" Woven Wire Screens for all screening, grading, sorting or sifting operations—remember Harveys. For "Harco" Screens, made in any gauge or mesh, ensure more accurate and therefore more profitable screening. They are designed to give increased output with long and uninterrupted service under all exacting conditions. Send for Catalogue No. G.J. 269.

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C.O.L

Fifth Conference of the International Gas Union Brussels 1952

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Numerous Gas and Coke Oven Engineers will have seen examples of U.C.B. Coke Oven Batteries (Tertre, Ville de Bruxelles, Marly) on the occasion of their Conference and will have appreciated their excellence and durability.

We invite those interested in this design of oven to get in touch with the Sole Licensees—

GAS CHAMBERS & COKE OVENS LTD.

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At Christmas Time

TO ALL OUR FRIENDS WE WISH TO EXTEND CORDIAL CHRISTMAS GREETINGS AND LOOK FORWARD TO INCREASED MUTUAL PROSPERITY IN THE COMING YEAR.

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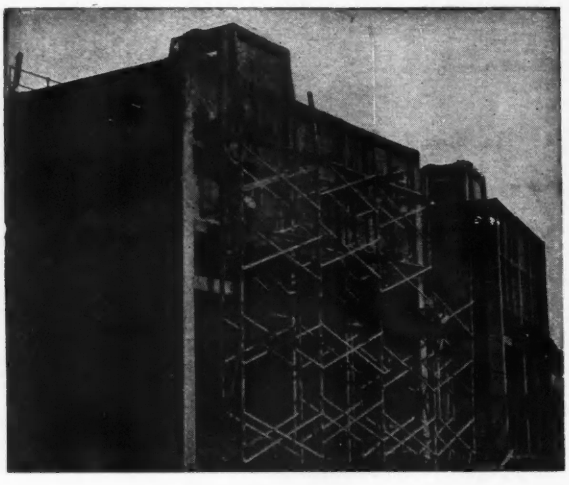
Gunite



One of the reinforced concrete structures reconditioned with Gunite for the City of Carlisle Gas Undertaking.

Gunite—concrete applied by air pressure—has numerous applications where its great density and extreme adhesion have exceptional value.

For repairing reinforced concrete it has particular merit, as, due to the method of application, a uniform density and adherence is obtained whenever Gunite is applied

For lining coal bunkers and steel chimneys it possesses great resistance to corrosion and protects steel-work from the abrasive action of coal or coke.

Handbook "GUNITE" sent on request

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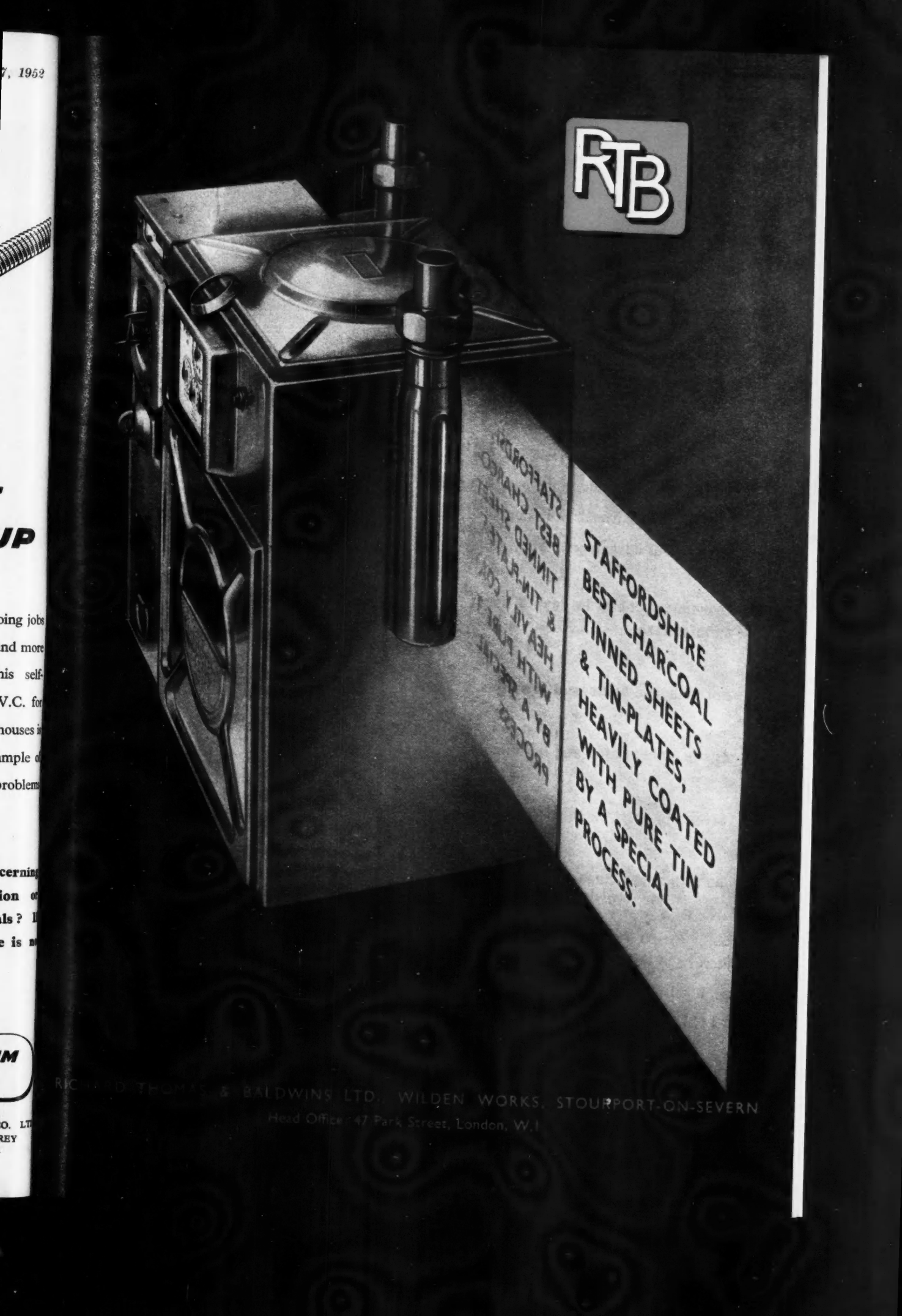
A lot of manual labour is wasted doing jobs which can be done more quickly and more efficiently by mechanical means. This self-emptying shovel specially designed by B.V.C. for the removal of hot ash and soot in boiler houses is such an example. This is but one example of B.V.C.'s modern approach to industrial problems using pneumatic extraction plant.

Have you a problem concerning the conveying, extraction or removal of light materials? If so please write us—there is no obligation.

B.V.C BRITISH VACUUM CLEANER **INDUSTRIAL VACUUM CLEANERS**

THE BRITISH VACUUM CLEANER & ENGINEERING CO. LTD. (DEPT 63A/1) GOBLIN WORKS, LEATHERHEAD, SURREY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BEST CHARCOAL
TINNED SHEETS
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HEAVILY COATED
WITH PURE TIN
BY A SPECIAL
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I.C.I. Copper tubes ensure trouble-free Gas Systems

For domestic gas systems, light gauge copper tubes made by the Metals Division of I.C.I. have five obvious advantages. They are:—

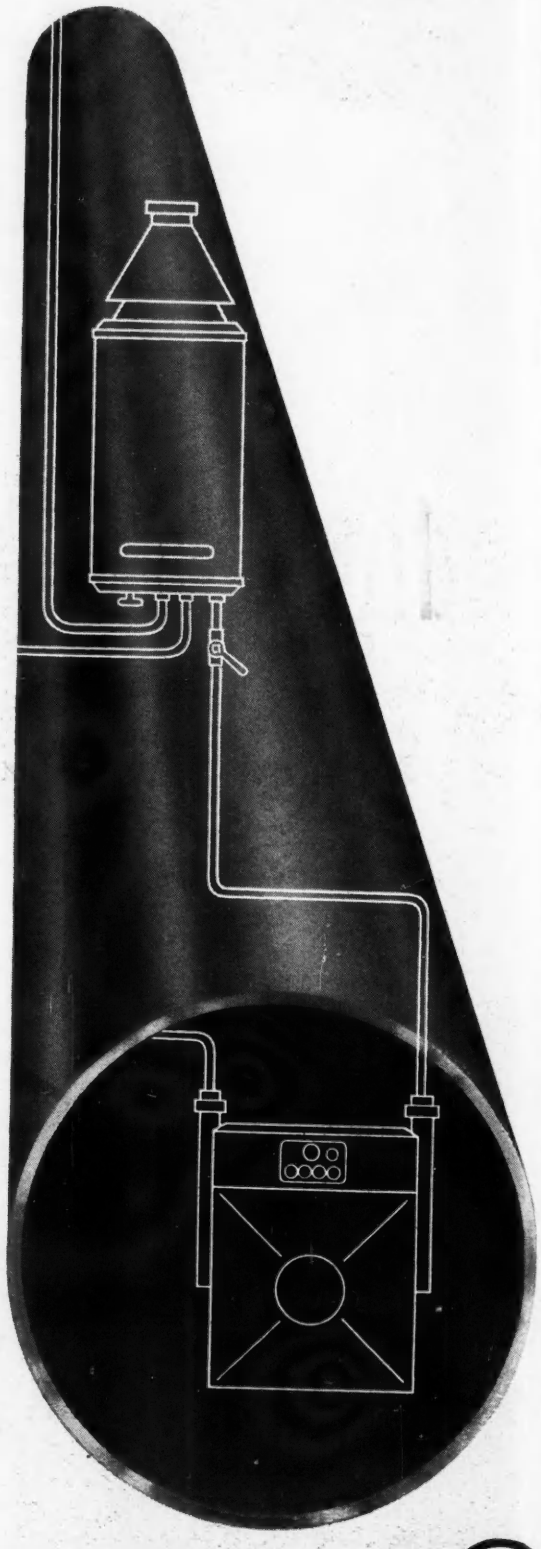
1 **Economical, both in laying costs and maintenance.**

2 **Not attacked by normal town gas.**

3 **Easily manipulated and installed.**

4 **Strong in relation to their light weight.**

5 **Neat in appearance.**



Whatever the building—farmhouse or factory; house, hotel or hospital—the job is better done with I.C.I. copper tubes.

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Fittings for copper tubes are made by Fyffe & Co. Ltd., Dundee, a subsidiary company of I.C.I.

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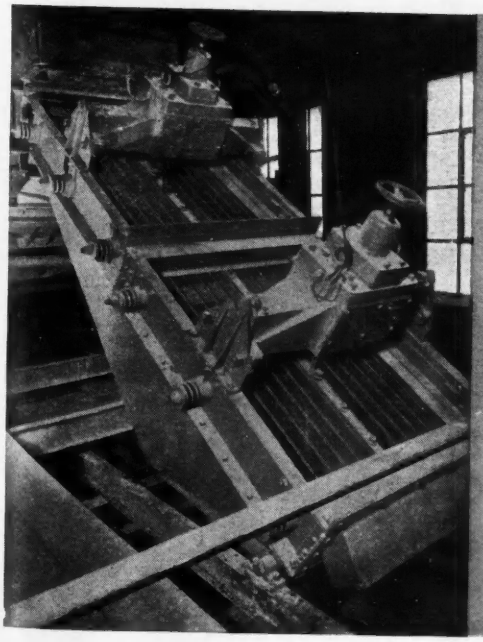
M.18

HUMMER

direct-to-mesh vibration gives better screening



- Use of electro-magnetic vibration reduces mechanical parts to a minimum; lowers maintenance.
- Ideal for *damp* materials as well as wet and dry screening.
- Wide range of sizes; with one, two or three decks.
- Particles stratified according to size giving maximum screening capacity.
- Can be controlled to suit material and load conditions.
- Screening down to 200 mesh. Cloth easily changed and tensioned.

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All-the-year round

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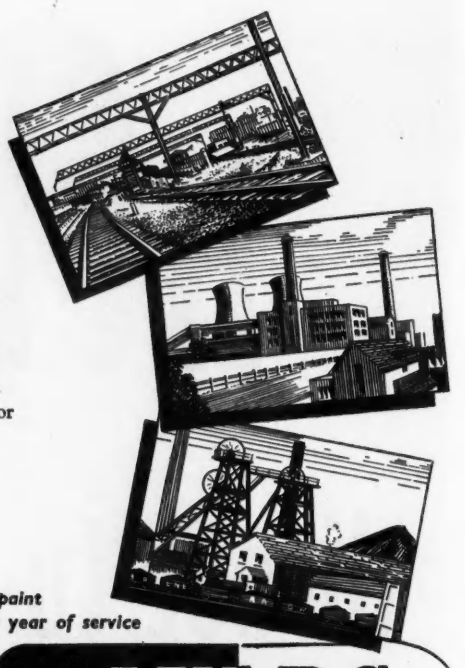

Can any paint withstand extremes of temperature the whole year through? Yes, when it's AVARC Silica-Graphite Paint, because it expands and contracts without cracking.

AVARC Silica-Graphite paints, made to our own special formulæ, have been accepted as standard paints for iron and steelwork by Gas Undertakings, large Industrial Corporations, Railway Companies, Power Station Authorities and public undertakings throughout the world. With AVARC Paints the Silica-Graphite base has no chemical action with the vehicle. The paint dries with a hard leathery skin which allows for expansion and contraction of the metal in all weathers.

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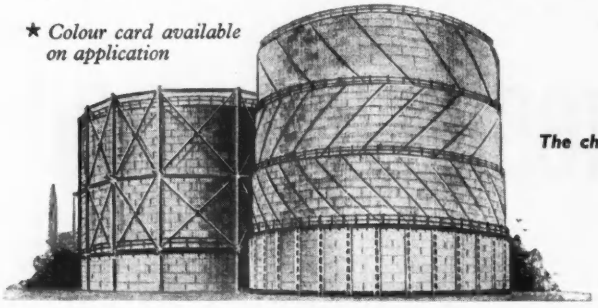

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Repairs—Parts Supplied

Impressive outline

Impressive output

This impressive installation erected at the Beckton Works of the North Thames Gas Board comprises four Carburetted Water-Gas Plants constructed by Humphreys & Glasgow Limited. The building achieves a massive beauty which is the more remarkable in an essentially functional building—literally erected around the four Plants.

The Gas Plants are equally impressive, the four sets having a capacity of 18 million cubic feet of 500 B.Th.U. gas per day. They are fully automatic and are operated by hydraulic power governed by a mechanical controller. Each set in continuous operation makes approximately 10,000 sequence value movements per day.

This is where the Lockheed hydraulic equipment comes into the picture—opening and closing the various valves at the bidding of the mechanical controller.

It is significant that Humphreys and Glasgow Limited—designers and builders of this and many other gas plants—should again choose Lockheed hydraulic equipment.

AUTOMOTIVE PRODUCTS COMPANY LIMITED, LEAMINGTON SPA, ENGLAND

Lockheed

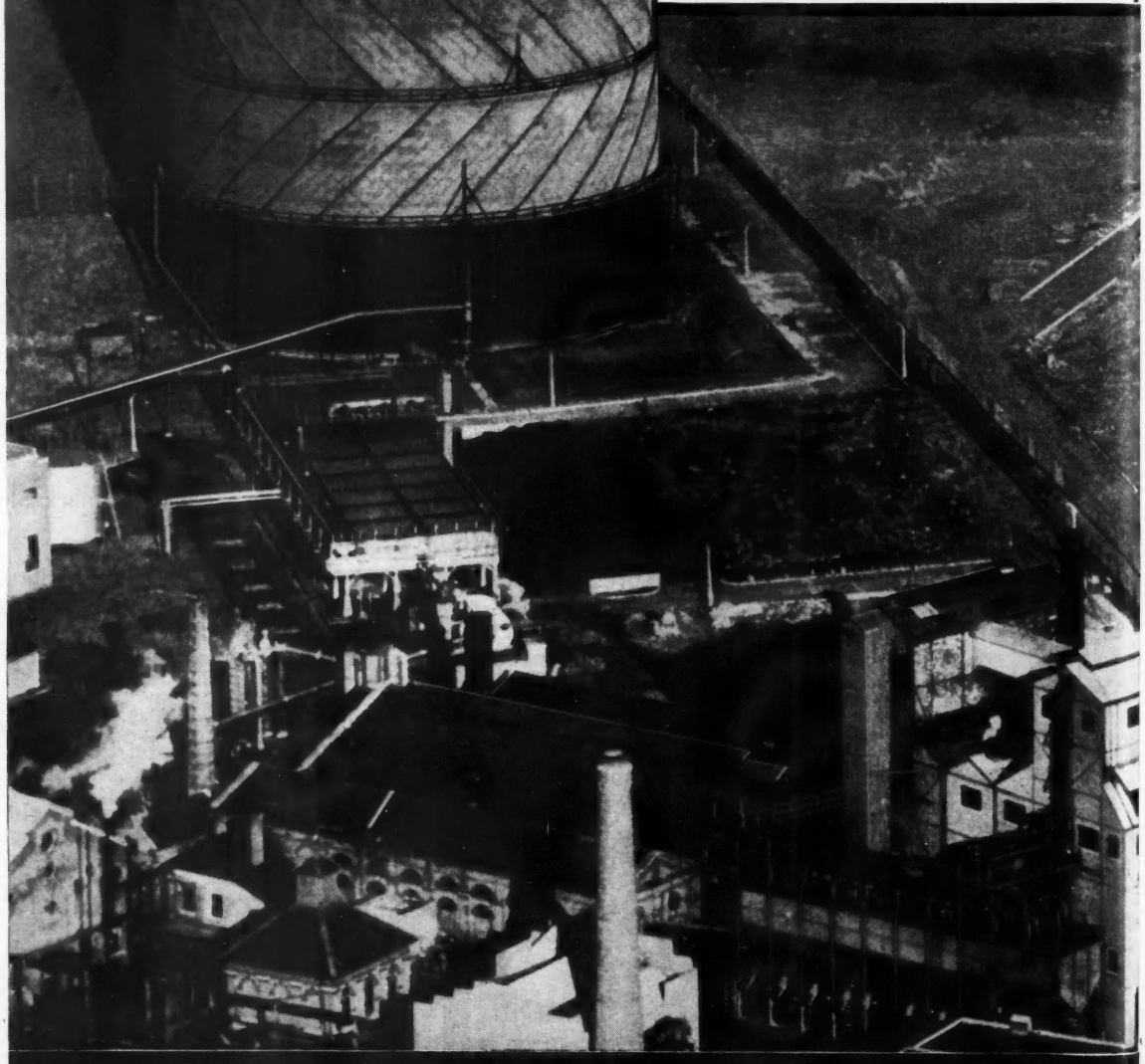
REGD. TRADE MARK

INDUSTRIAL HYDRAULICS

OXLEY

ALL-WELDED GASHOLDERS

The illustration shows an aerial view of a 1,500,000 cu. ft. all-welded, spiral-guided gasholder.
Steel tank 140 ft. dia. by 38 ft. 3 ins. deep.

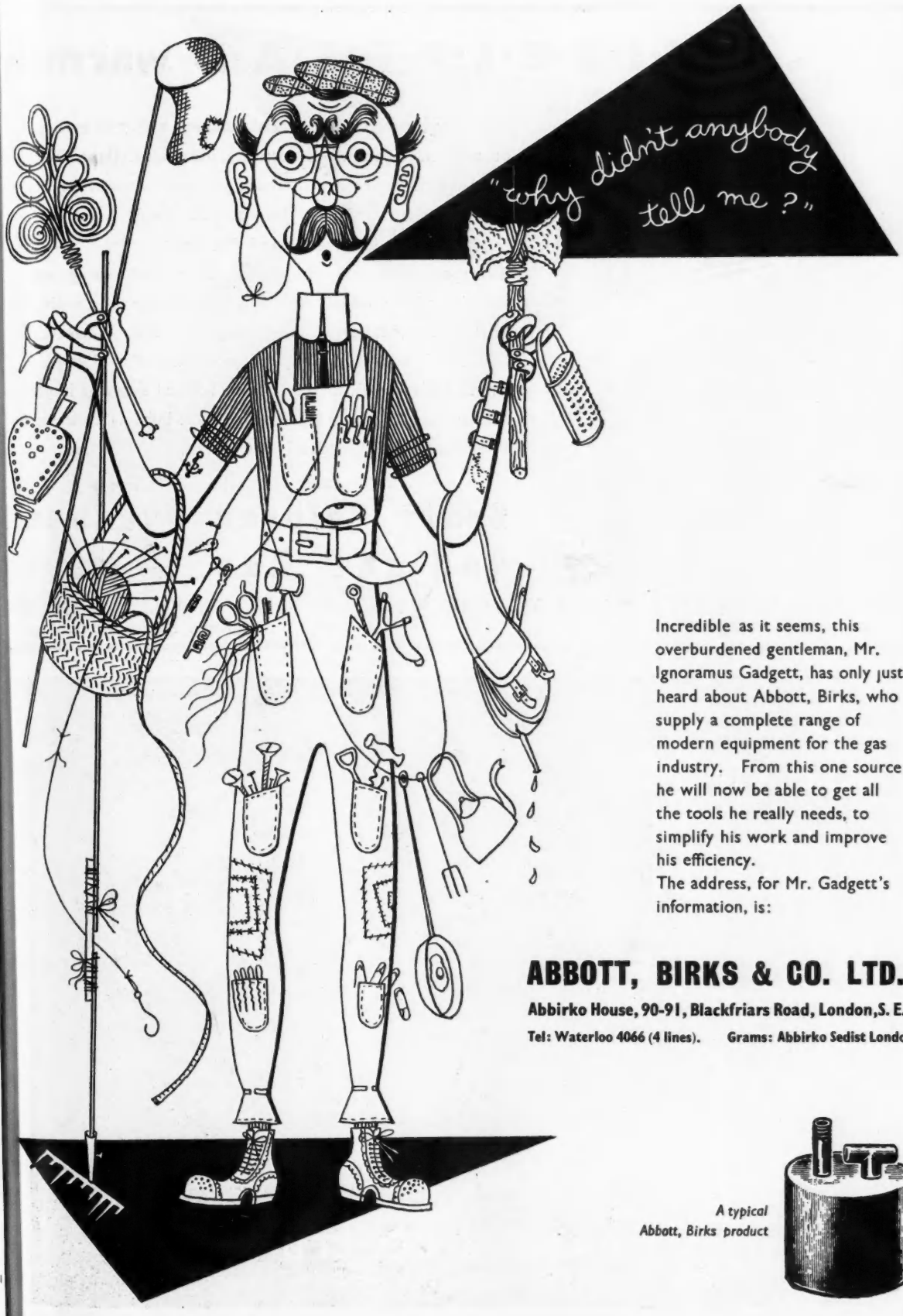


OXLEY ENGINEERING CO. LTD., HUNSLET, LEEDS 10

Telephone : Leeds 32521
Telegrams : Oxbros, Leeds 10

London Office : WINCHESTER HOUSE, OLD BROAD STREET, E.C.2.
Telephone : London Wall 3731 Telegrams : Asbengpro, Stock, London

W.131

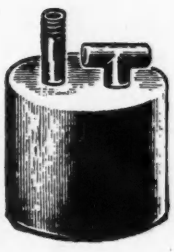


Incredible as it seems, this overburdened gentleman, Mr. Ignoramus Gadgett, has only just heard about Abbott, Birks, who supply a complete range of modern equipment for the gas industry. From this one source he will now be able to get all the tools he really needs, to simplify his work and improve his efficiency.
The address, for Mr. Gadgett's information, is:

ABBOTT, BIRKS & CO. LTD.,

Abbirko House, 90-91, Blackfriars Road, London, S. E. 1

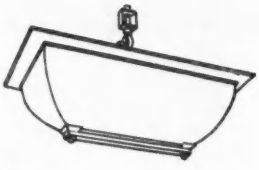
Tel: Waterloo 4066 (4 lines). Grams: Abbirko Sedist London



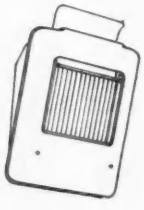
A typical Abbott, Birks product

W·I·D·E·S·P·R·E·A·D warmth

In all large public and industrial buildings where an even spread of comfortable warmth is necessary, use Bratt Colbran Overhead Gas Heaters. Suspended from ceilings or fixed on walls, they radiate their heat downwards, like the sun, and provide a constant temperature that is invigorating and free from stuffiness. Valuable floor space is saved by this modern method of heating, and the shielding of persons by persons, by furniture, by pews in churches or machinery in factories, is completely eliminated. Where localised heat only is occasionally required (e.g., parts of workshops, or at church christenings), the heaters can be used singly or in groups, thus saving the cost of heating the whole building unnecessarily. Write for full technical details and leaflets.



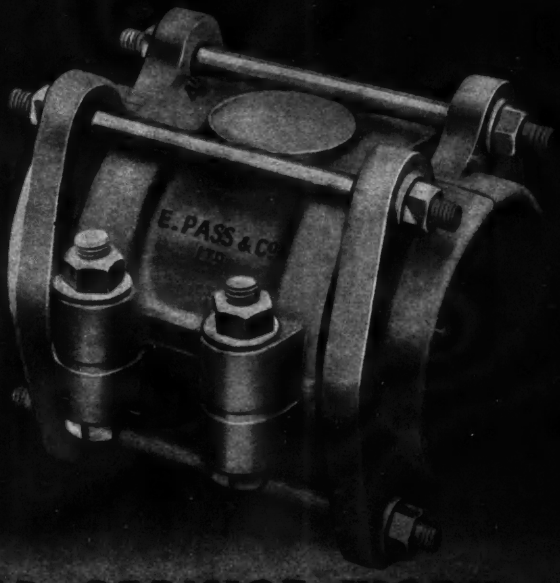
There are three types of heater: 1. The Luminous Panel Heater; 2. The Wedge Heater; 3. The Junior Luminous Panel Heater. The latter is specially designed for use in smaller buildings or for rooms with lower ceilings.



Bratt Colbran Overhead Radiant Gas Heaters

BRATT COLBRAN LIMITED · LANCELOT WORKS, LANCELOT ROAD, WEMBLEY, MIDDLESEX
Telephone: Wembley 6221. *Telegrams:* Proteus, Wesdo, London.

GLANDED SPLIT COLLARS



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GAS & WATER ENGINEERS DENTON LANCS.

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Recently put to work are the additional five beds of horizontals 24″ x 18″ x 20′ 0″ through with extensions to the Coal and Coke Plants.

GALASHIELS
Coke Grading Plant with Storage Bunkers of 200 tons capacity. A scalping screen and main screen grade the coke into four sizes.

PROVAN
An installation of ten Reciprocating Coke Screens on existing bunkers and here shown the debreezing equipment at the outlets.

—IN SCOTLAND YOU WILL SEE

OTHER WORK IN PROGRESS

Coal and Coke Handling Plants at ***FALKIRK.*** *Coke Grading Plants at* ***VALE OF LEVEN*** *and* ***ARMADALE.*** *Stoking Machinery at* ***NORTH BERWICK.*** *Stoking Machine with Coal and Coke Handling Plants at* ***KIRKINTILLOCH.***

W. J. JENKINS CO., LTD., RETFORD, NOTTS.

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Purifier to be changed
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FOR FURTHER INFORMATION WRITE TO ADDRESS BELOW
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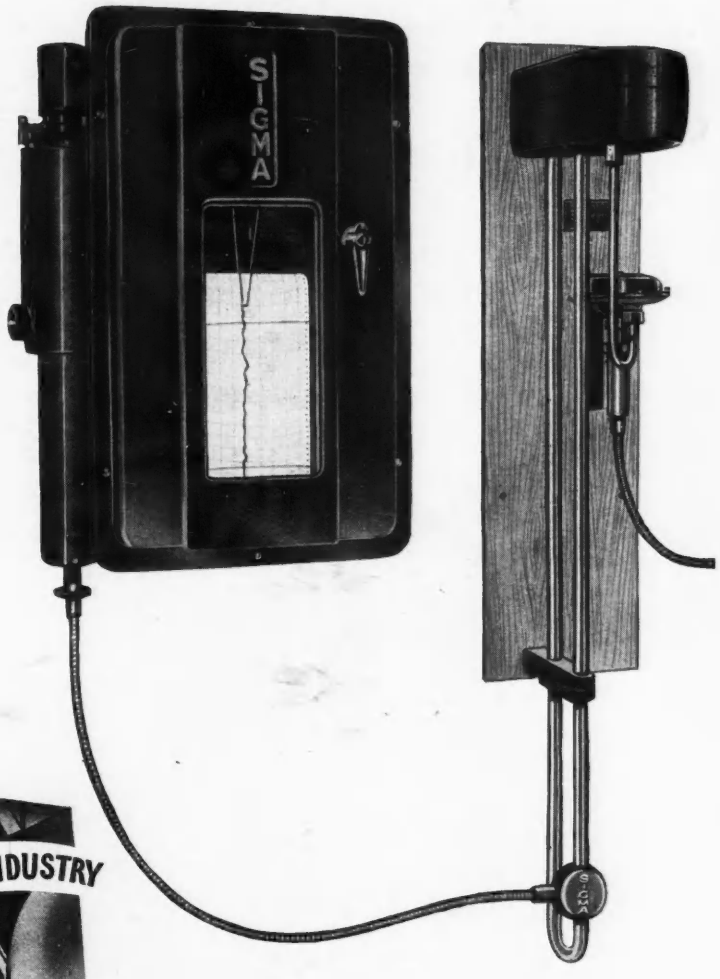
SIGMA

Recording Calorimeter

MK. II



Will record calorific value of ANY gas which will burn up to 2,000 B.Th.U's.
Not affected by normal changes in temperature and pressure.
Rapid response to changes in C.V.
Can be fitted with transmitter for distant indicator or recorder and for automatic control systems.
All parts heavily protected against corrosion.

Old Type Calorimeters still available for early delivery.

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LETCHWORTH HERTS

FWS 233

B

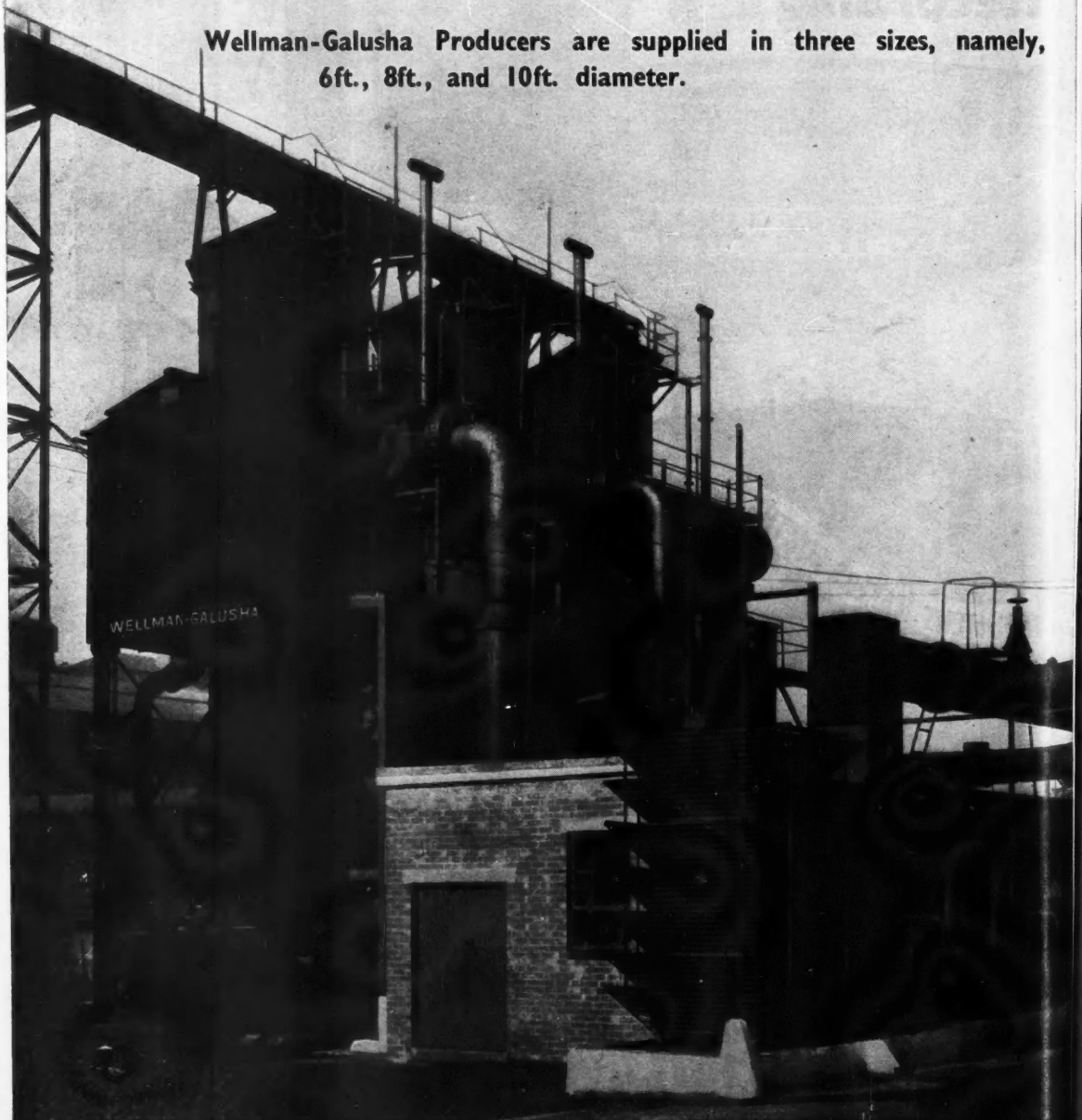
Wellman-Galusha Gas Producers

generate

High Quality Gas from Low Grade Fuels

A battery of three 8ft. diameter Wellman-Galusha Gas Producers, equipped with fuel storage bins and Gas Cleaning Plant, for the efficient gasification of anthracite, coke or coke breeze.

Wellman-Galusha Producers are supplied in three sizes, namely, 6ft., 8ft., and 10ft. diameter.



THE WELLMAN SMITH OWEN ENGINEERING CORPN. LTD.
PARNELL HOUSE, WILTON ROAD, LONDON, S.W.1 WORKS: DARLASTON, SOUTH STAFFS.

OPERATION 'SERVICE'

Our Spares and Repair Service is available to all Jones Cranes owners.

We have a fleet of Vans fully equipped to do repairs : we have a team of experienced Jones Cranes Service engineers, and we have Depots all over the country inter-connected by tele-printers.

This means we are able to answer S.O.S. calls in a matter of hours and to provide a regular and helpful maintenance service to Jones Cranes owners.

JONES KL CRANES *take the load!*

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Designed, Manufactured and Exported by their Associates:
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THE 600 GROUP OF COMPANIES

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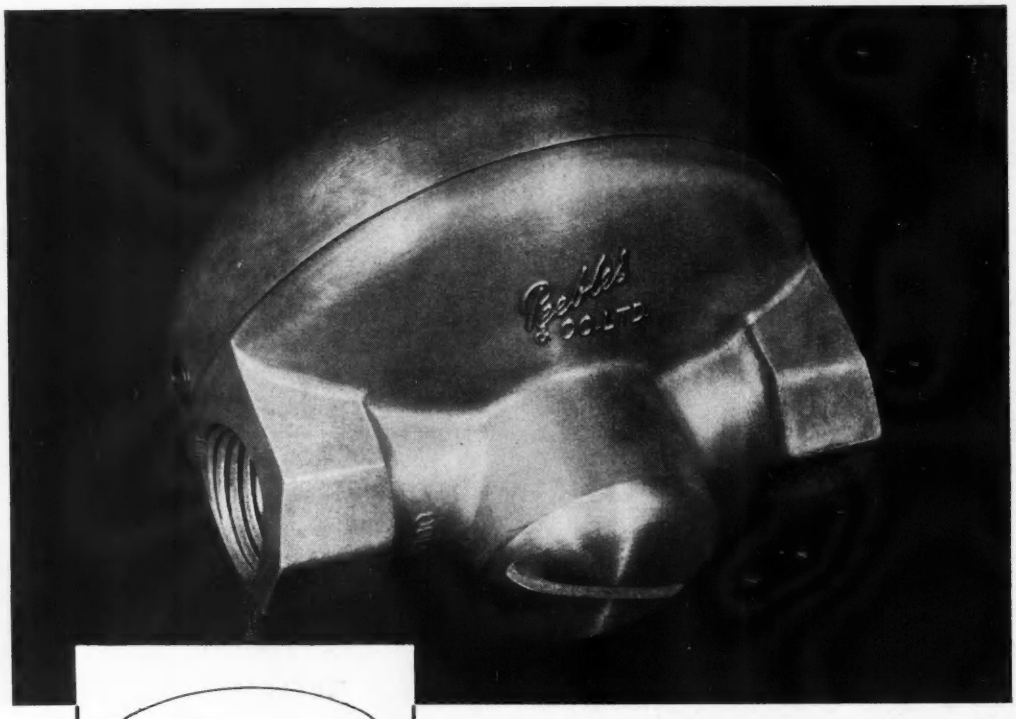
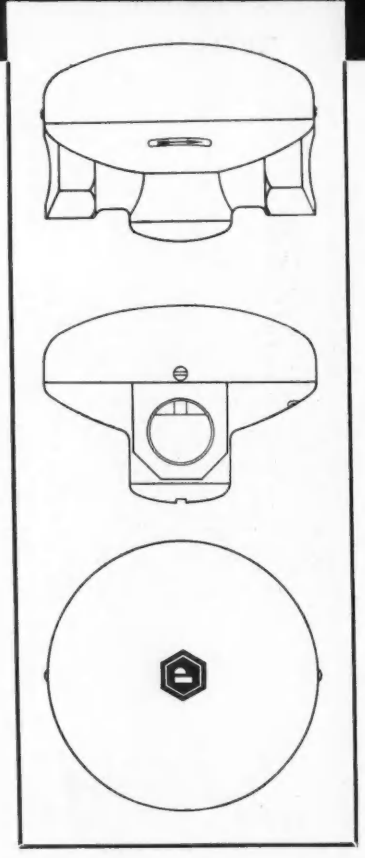




BEST FROM EVERY POINT OF VIEW

The new "Fig. 100" Appliance Governor is exceptional, not only in smooth exterior appearance, but also in its internal design, and its performance. Pressure die cast for close grained metal, designed and precision-made for stable performance and minimum maintenance costs, **it gives excellent response to every demand made upon it.**

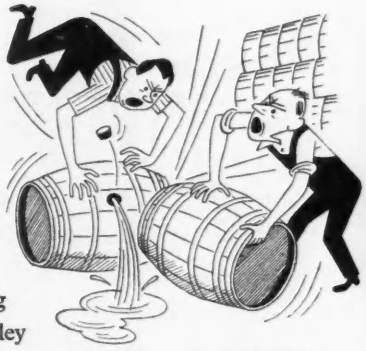
Write for full particulars.

The FIG. 100 by PEEBLES

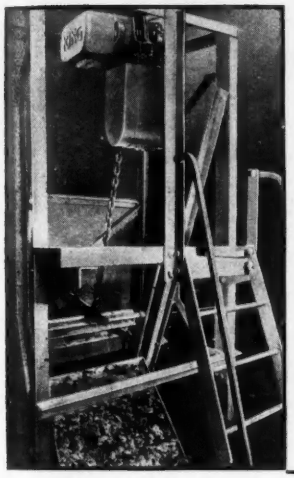
PEEBLES & CO., LTD., TAY WORKS, WEST BOWLING GREEN STREET, EDINBURGH, 6

IT'S CRAZY WEEK AT THE

FACTORY FOLLIES



CRAZY week performances crop up even in otherwise well-run factories when it comes to lifting and shifting. And the fun-and-games holds down output and piles up costs. Cut out the humping and heaving with a My-Te-Min electric pulley block. Let work flow to where it is wanted by overhead conveyor. Then see the difference; more work space, less fatigue, less damage, bigger output. There's a KING installation for every need, from a single My-Te-Min to a full-scale conveyor system.



WHAT'S YOUR LIFTING-AND-SHIFTING PROBLEM?

(*left*) A KING 2½-ton Mammoth Electric Pulley Block—operated by remote control—handling a skip of coal in a gasworks.

WRITE FOR ILLUSTRATED LEAFLETS

KING REGISTERED TRADE MARK

CONVEYORS, CRANES, PULLEY BLOCKS

GEO. W. KING LTD., 25 WORKS, HITCHIN, HERTS. TEL: HITCHIN, 960. AND AT STEVENAGE

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150 horse-power

FOWLER

Diesel Locomotive

at Messrs. Boots

Beeston Factory, Nottingham

CLEAN AND SMOKE-FREE operation is essential for the manufacture of pharmaceutical products. This is one of the many advantages achieved by the use of Fowler Diesel Locomotives.

FOWLER LEEDS

DIESEL LOCOMOTIVES

In rail gauges from 2ft.—5ft. 6ins.

Information and literature from:
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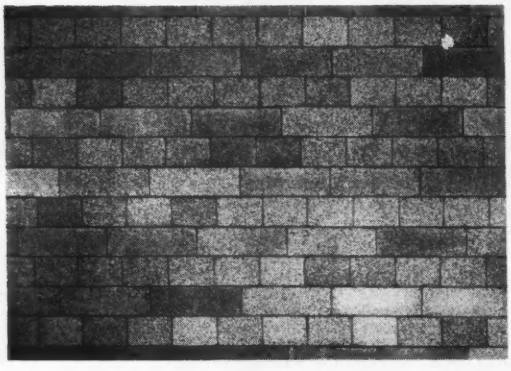

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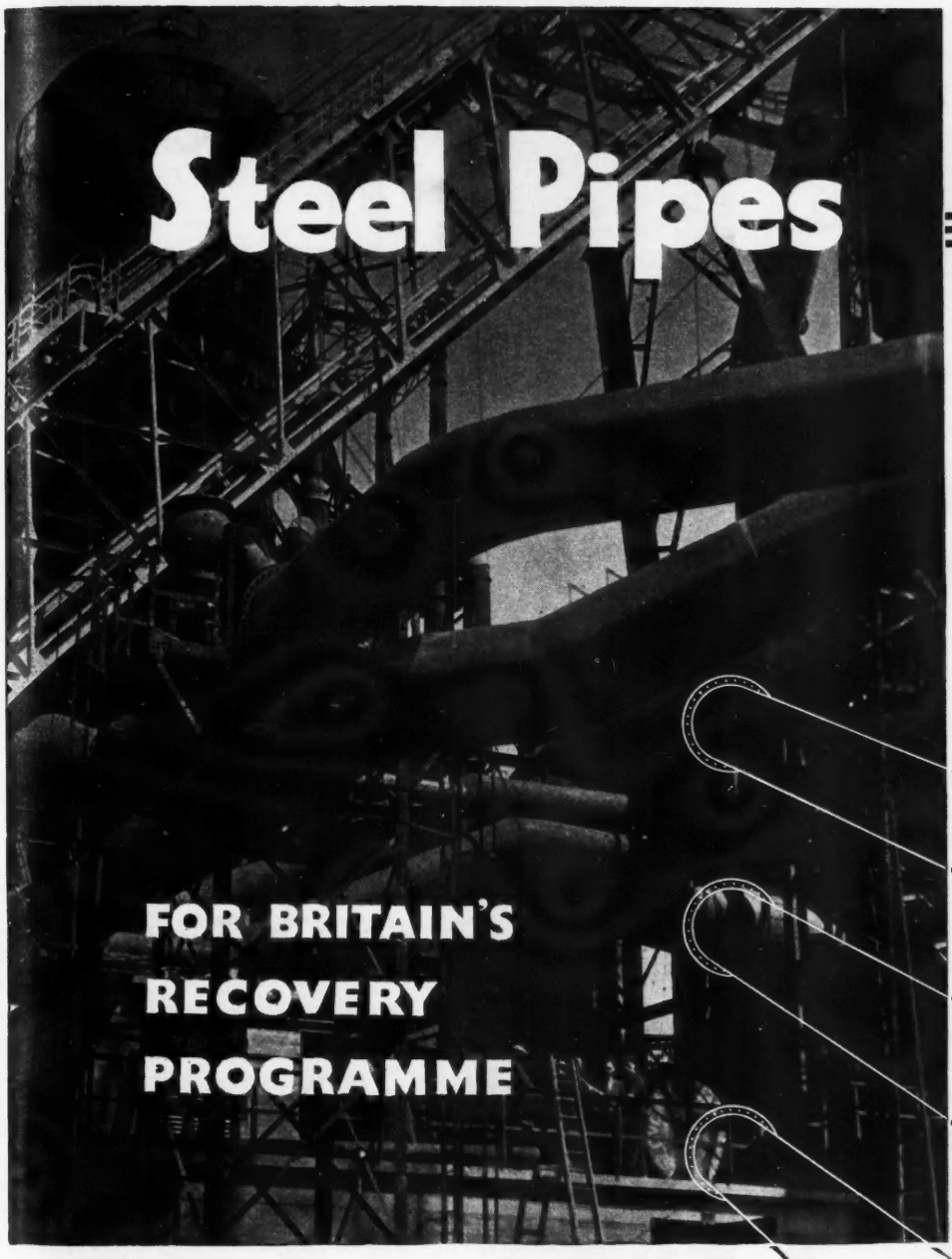

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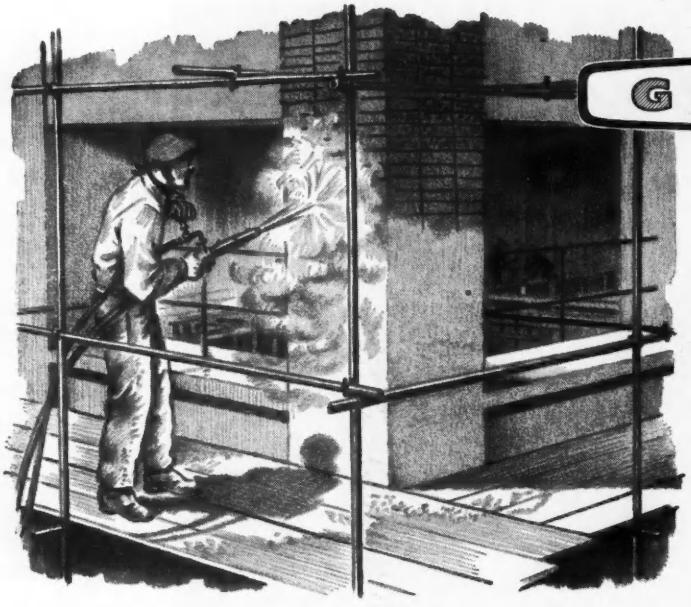

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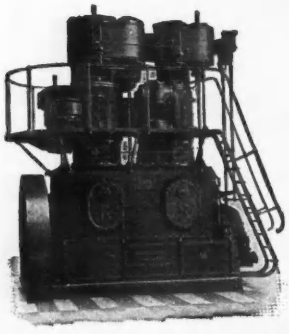

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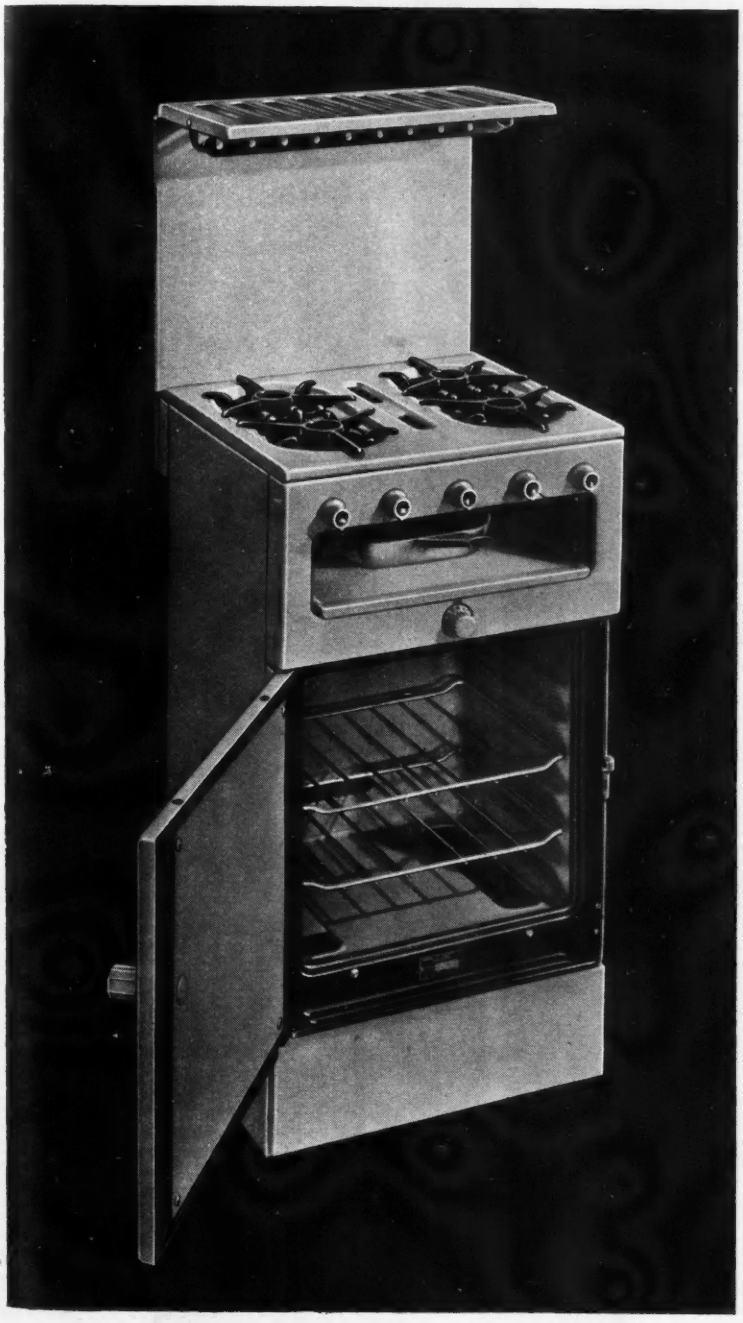

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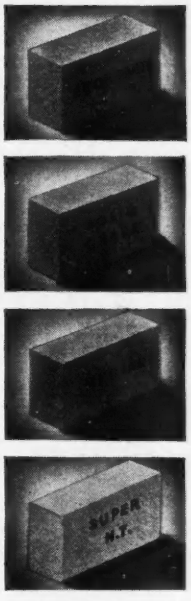

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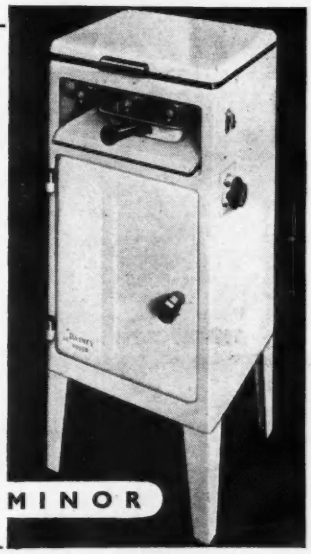

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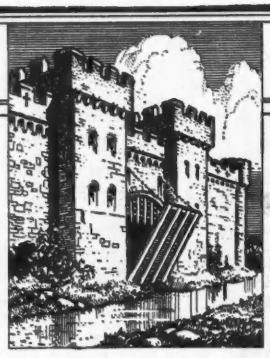

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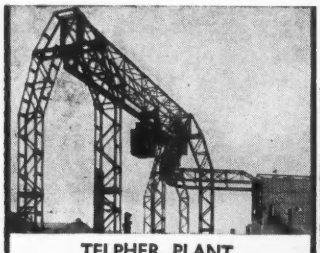

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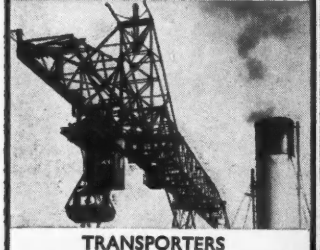

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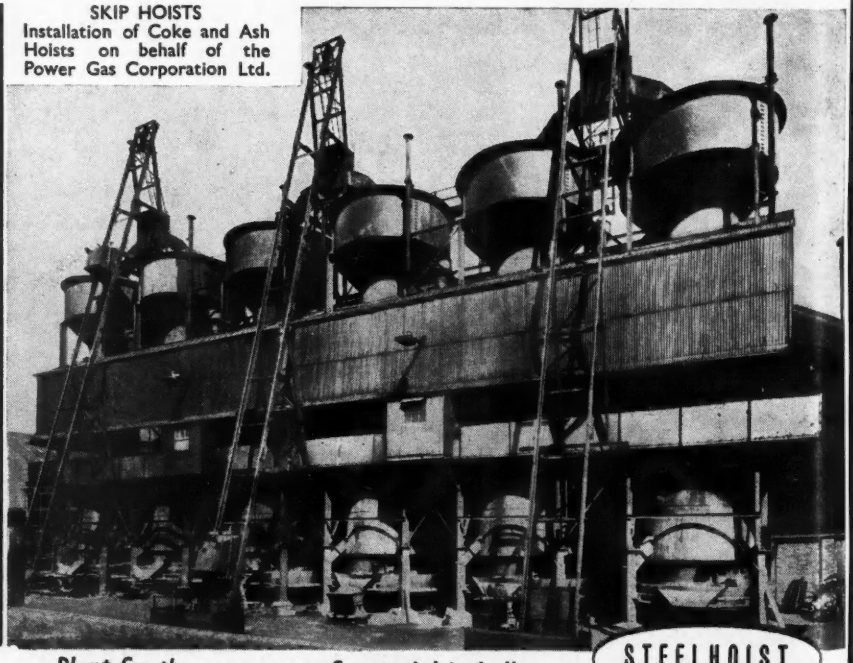

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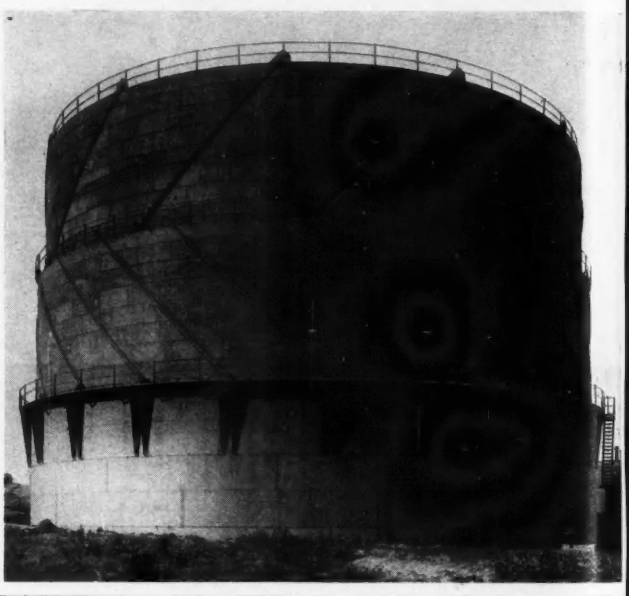

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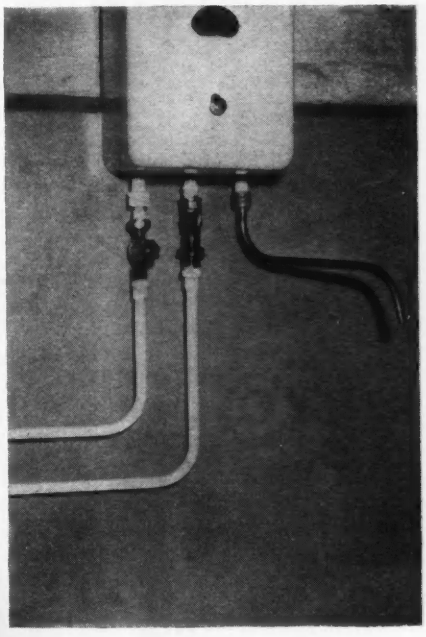

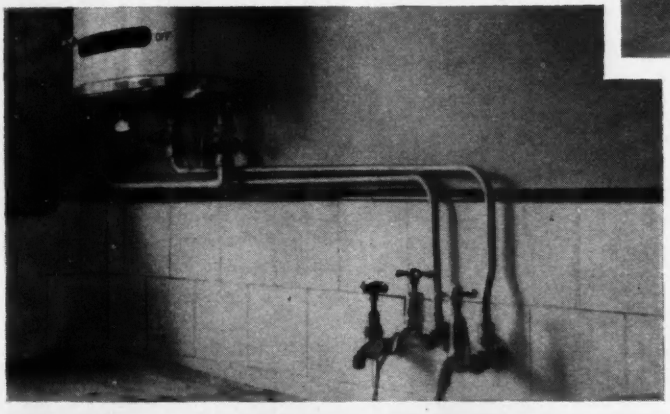

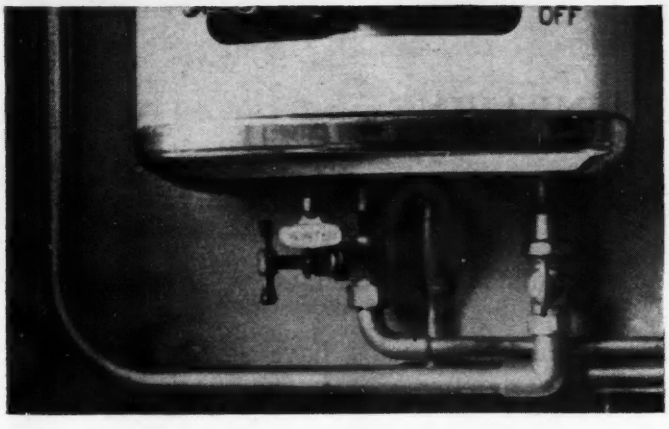

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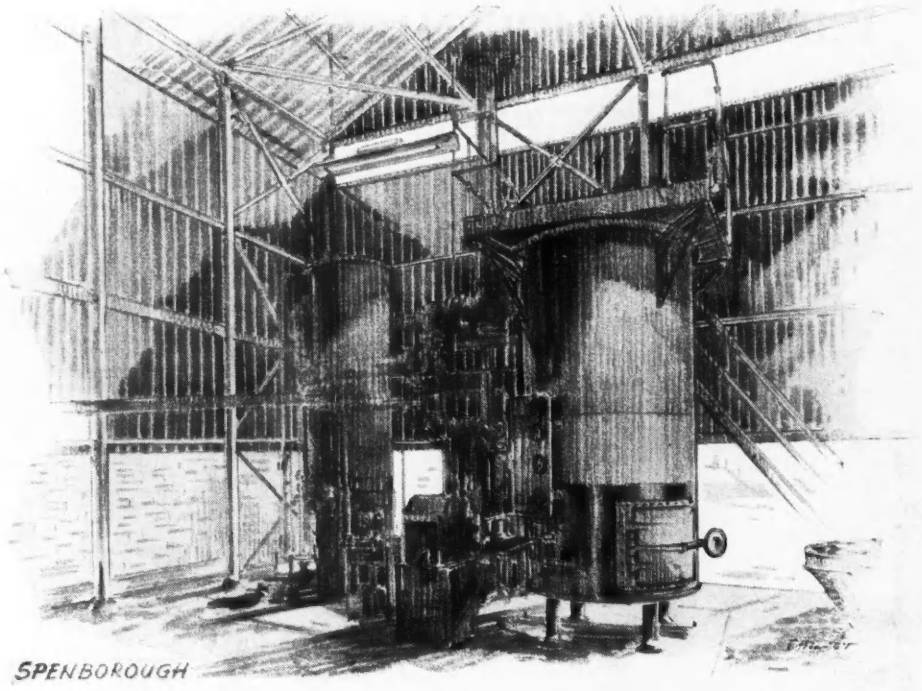

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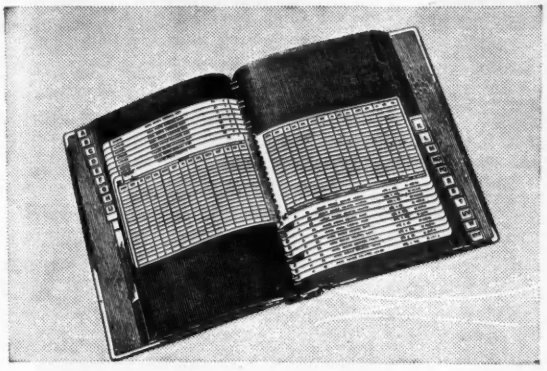

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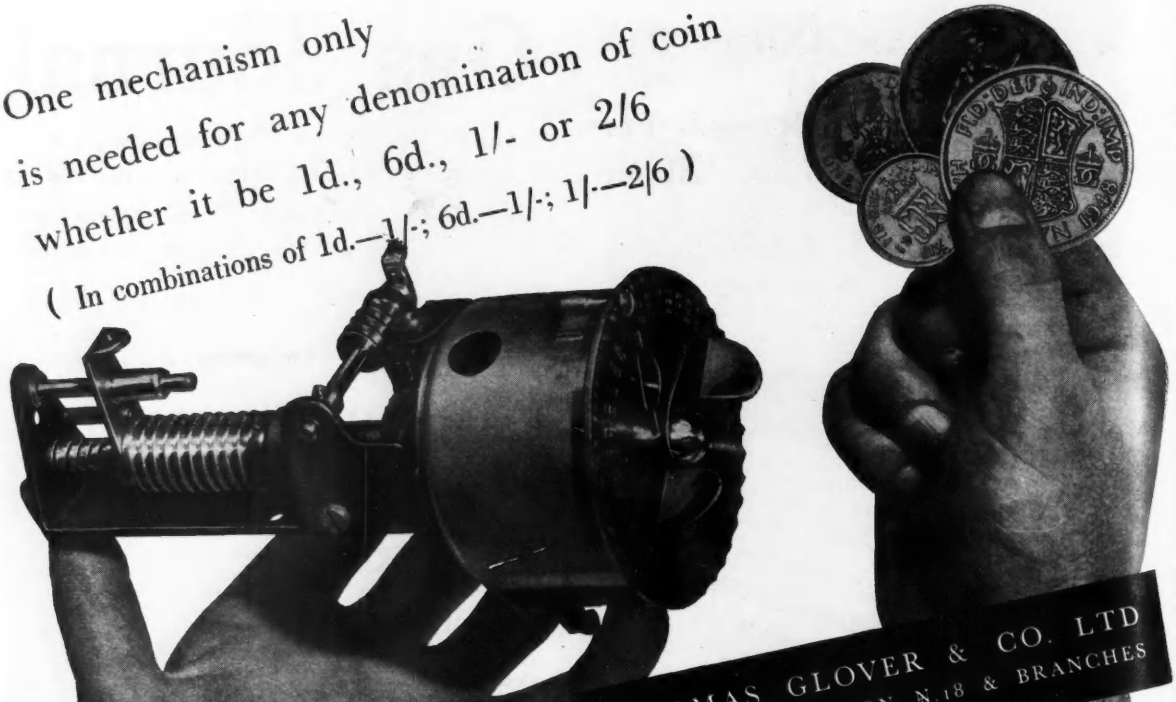

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GAS JOURNAL

VOL. 272. No. 4672 104TH YEAR DECEMBER 17, 1952

EFFLUENTS

THE growing practice of staging discussions in the regional sections of the Institution of Gas Engineers of papers already presented at the annual meetings was amply justified in the excellent discussion in Birmingham of the joint paper by Dr. W. H. Blackburn and Messrs. T. G. Tomlinson and T. H. Summers on the treatment of gasworks liquor, which communication was given at the 1951 research meeting. In the first place this practice is peculiarly appropriate to papers in the research class because there is seldom sufficient discussion of them anyway. In the second place this particular paper was most suitable for extended discussion in the Midlands where so much of the work has been and is being done.

Mr. E. T. Pickering, the new Area Chief Chemist to the West Midlands Gas Board, summed up the position showing that a considerable campaign is now in full swing towards a solution of the problem. The discussion revealed the keen sense of urgency with which it is viewed at any rate on the gas industry side. For this is, as Mr. Hurley, of the Wolverhampton Sewage Department, said, at least a tripartite job involving the gas industry, the sewage purification departments, and the new river boards—with a fourth in the riparian owners and perhaps a fifth in the local governments generally, about which Mr. Wakeford had something very pertinent to say at the end of the discussion.

Besides urgency there was evidence of some impatience, voiced by Mr. Rendle but no doubt felt in many quarters. The feeling is natural enough. The new concentrated gasworks are going up. The effluent is beginning to run into the sewers. And something must be done about it. Could we not have something more practical, some investigation of actual effluents rather than these academic fractions? The answer is pretty obvious. We shall get nowhere until we get a rational —'scientific' is the jargon—idea of the effect of the several numerous constituents of the liquor, present in varying proportions in liquors which differ in nearly every case. We shall get nowhere if we lose ourselves in a maze of variables. The plan of campaign adopted by the Joint Research Committee in collaboration with the Water Pollution Board is plain and straightforward with every prospect of success. The selection of a purely domestic sewage for the experimental addition of gasworks effluent by itself is surely the obvious commonsense way of reducing the variables to the practical minimum. In short it is pre-eminently the practical approach to the problem. There is every reason to suppose that it will yield the answer to the riddle.

In the meantime something must and can be done. Mr. Wedgwood summarised certain of the steps that could be taken in some cases and to some extent. Gasworks, he said, should have an efficient ammonia concentration plant, the mixed liquor should be distilled and discharged at a regular rate in step with the sewage flow, and retort house liquor and if possible all ammoniacal liquor should be used as a fertiliser or to break down waste vegetable products of the land, though Mr. Rendle, who has done much in this direction, warned us that the last mentioned outlet could only be applied in rural districts.

The problem is urgent from several angles, not the least of which is that of water supply. Mr. Price, of the Severn River Board, pointed out that the rivers are increasingly drawn upon for supplies of water of more or less potability. It is not so much the fish that we should be concerned about as the human population. Perhaps the most encouraging note of the discussion —and the same was true of last autumn's discussion— was the conviction that this is a problem to be tackled and solved by common agreement and collaboration between the several parties involved, and not by litigation. This is where the local authorities may come in and where we may note Mr. Wakeford's ingenious plea that the gas industry, by reducing the amount of solid fuel consumed and by reducing the weight of consequent residues to be handled by the local cleansing departments, is making a substantial contribution to whatever additional expenditure may be thrown upon their sewage departments for the treatment of gasworks effluent.

NATURAL GAS IN ITALY

INTEREST in the British gas industry's research on natural gas and the collection of methane from coal mines and its utilisation in augmenting or in substitution of supplies of coal gas is increased by the news from Rome that in the middle of November the Cremona city gasworks extinguished the last of its furnaces for the extraction of gas from coal, and that henceforth methane will be piped direct to consumers from a large new natural gas extraction plant at Cortemaggiore, 20 miles south-west of the city. We are not optimistic enough to believe that Britain will discover such inexhaustible supplies of methane as are to be found in Italy, but even if only a small quantity is made available it may assist in solving some aspects of the peak load problem in those parts of the country within measurable distance of the source of supply.

It is 14 years since experiments in exploiting natural gas industrially began in the Po Valley, and developments have been speeded up in the last four years. Probably considerably more than 80,000 square kilometres of Italy contains vast quantities of high quality methane gas mingled with 88 octane spirit, which emerges from borings in a state of purity which eliminates the need for refining. According to Anthony Mann, a special correspondent of the *Daily Telegraph*, over 1,000 steelworks, power stations, textile mills, and other plants are working exclusively on methane. Under Government supervision 900 miles of steel pipelines have been installed and a further 1,250 miles are under construction. Wells already in use have a potential yield equivalent to 6.5 mill. tons of coal a year, and production is already at the rate of more than 160 mill. cu.ft. per day, equal to 7,000 tons of coal daily. Methane and its allied products are replacing imported solid and liquid fuel in three main spheres—as a source of industrial power, as motor spirit, and as gas for domestic purposes. The Cortemaggiore plant alone now yields 100 mill. cu.ft. of gas daily, together with nearly 400 tons of liquid products. Nearly all the major cities of north central Italy are connected to the pipeline system and other towns are to be added shortly. It seems that within a few years Italy will need hardly any imported coal, and her petroleum imports will probably be halved.

EFFICIENCY OF 'IMPROVED' APPLIANCES

MUCH INTEREST ATTACHES to a paper by Mr. L. L. Fox, of the Fuel Research Station, D.S.I.R., published in the November issue of the Journal of the Institute of Fuel. The paper in question discusses the efficiency of domestic space-heating appliances using solid fuel. In the period since the war there has been co-ordinated testing of solid fuel appliances resulting in the extensive use, in new and existing houses, of those appliances which the tests have shown to be 'improved.' The scheme set out to foster the production of appliances to bring about a gradual change-over from bituminous coal to solid smokeless fuel. Against this background, says Mr. Fox, two facts are now emerging. First, there has not been an increase in the availability of solid smokeless fuel for domestic heating. Secondly, the improved appliances have been designed primarily to be coke-burning in order to meet the standards of performance to which they must conform in order to be classed as 'improved.' As a generalisation, the author states that the test-bench efficiencies of the 'improved' appliances when burning bituminous coal are about 75% of the corresponding efficiencies when burning gas coke. The 'improved' appliances without boiler have test-bench efficiencies ranging from 25 to 40% when burning bituminous coal. The corresponding figure for the 'ordinary' open fire is 25%. As about 87% of the solid fuel used directly for domestic heating is raw coal, the conclusion is drawn that the time has come to press for the development of more efficient coal-burning space heaters. Another conclusion which could well be drawn is that the time has come to press for the development of carbonisation in the production of smokeless solid fuels. In any case, in making a comparison between appliances of different types it is necessary to consider their respective performances when installed in a house. Comparison should be made on the basis of room heating efficiency.

WASTE OF CINDERS

CANDID COMMENT on the waste by British housewives, or their husbands, of more than 750,000 tons of fuel a year in the form of unburnt coal and cinders was made in a recent House of Lords debate on the Ridley report. Lord Morrison, formerly a Tottenham schoolmaster, accusing housewives of 'an amazing waste of coal,' said they should be told in plain language that throwing away cinders and half-burnt coal was just as bad as tearing up money and throwing it away. The Tottenham Corporation recovers about 50 tons of cinders per week from its house refuse, with a calorific value of 60% of the original coal. The cinders have a ready sale for brickmaking and greenhouse heating and are sold at £1 a ton, and the demand is so great that the quantity available could be sold ten times over. Leeds Corporation last year recovered and sold 6,000 tons of cinders from 80,000 tons of household refuse, some being sold back to housewives and some being used for heating and firing the Corporation's own plant. More was made into fuel nuts after being mixed with pitch and sold at £4 5s. a ton. Even the dust was sold at 6d. a ton for agricultural use. The Corporation covered the cost of plant repairs, wages, and power, and made a profit of £400. An encouraging increase in the production of improved grates, referred to in the debate by Lord Leathers, Minister for Co-ordination of Transport, Fuel and Power, has reduced slightly the amount of cinders produced. Discussions are taking place between the Ministry of Fuel and Power and the appliance manufacturers about higher standards of performance which might be adopted for solid fuel heating appliances. Meanwhile, the housewife must be convinced that one of the best methods of saving fuel is by sifting cinders in the home. The increasing difficulty of getting domestic help has not enhanced the general attitude towards the job. It would help a great deal if inventors could devise means of sifting refuse without raising dust.

NATIONALISED INDUSTRIES AND THE STATE

LORD EUSTACE PERCY, a Past President of the Society of British Gas Industries and late Vice-Chancellor of the University of Durham, in a recent broadcast talk on 'Nationalised Industries and the State,' with particular reference to 'Problems of Nationalised Industry,' edited by W. A. Robson, remarked that there is not much difference between the public board administering a State-owned industry and a board of directors under the Com-

panies Acts administering a large industrial concern. There is nothing particularly new about these experiments in nationalisation, and a visitor from Mars might well be puzzled by the political controversy to which nationalisation gives rise. It is inevitable that the electorate should hold the Government responsible for such miscellaneous matters as the price of gas, the cost of travel, electricity cuts, the wages of steel workers, the efficiency of hospital surgeons and nurses, and the supply of dentures; if they did not do so they would be exposing themselves to all the dangers of arbitrary government which the British political system was designed to avert. We had tried to give partial self-government to our nationalised industries, but in this field partial self-government did not work—it was impossible to draw the line between reserved and delegated power. Self-government could only be made to work if ministers were relieved of all responsibility, and his own opinion was that something like that would eventually happen, and that we should eventually have a new industrial statute of Westminster. Some if not all of the nationalised industries would be reconstituted as independent trusts to which the Government would stand in a clearly defined relationship.

In Lord Eustace Percy's opinion the efficiency of nationalisation would generally be judged by the service which the nationalised industry rendered and according to its willingness to incur the heavy costs of capital development. Capital expenditure was to be measured not by the earning power of the industry but by the general state of the national finances. One of the most difficult long-range problems of nationalised industry might well prove to be how to maintain a good producer's moral within the limits of development dictated by the over-riding need for the maintenance of the public credit.

Obituary

Mr. J. W. Wearmouth, an engineer with the old Sunderland Gas Company, until his retirement, has died at the age of 73.

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Mr. A. L. Robertson, former Engineer and Manager of the Wigton (Cumberland) Gaslight and Coke Company, has died after a long illness. He was 72 years of age and was Manager for 33 years, retiring three years ago.

◇ ◇ ◇

Mr. Arthur L. Griffith, widely known and greatly esteemed throughout the industry as Secretary for 30 years of the Society of British Gas Industries, died at Worthing on December 7. He retired in 1935, having filled the office of Secretary from the formation of the Society which, in its 21st anniversary brochure, acknowledged as the inspiration of its inception a leading article in the *Journal* in December, 1904, calling attention to the desirability of forming an institution of Gas Plant and Apparatus Makers. Mr. Charles Clare acted on the suggestion and called together a number of manufacturers at the close of the Earls Court Gas Exhibition. The outcome was the formation of the S.B.G.I., the first meeting being held in March, 1906. At that time Mr. Griffith was appointed permanent Secretary, and his assiduous interest in the affairs of the Society and his unfailing courtesy promoted its success in no small degree. At the annual meeting in 1931 Mr. Frank West presented Mr. Griffith with a cheque in token of the esteem of the Council and past Chairmen for the work he had done during a quarter of a century of service. On his retirement he was succeeded by Mr. M. W. Burt, M.B.E., who continues to hold the office of Manager and Secretary.

Personal

Mr. H. Cecil Booth, F.C.G.I., M.I.C.E., was recently the recipient of a presentation from the staff of the company to mark his retirement from the chairmanship of the British Vacuum Cleaner and Engineering Co., Ltd. The presentation was made by Mr. J. J. Hambidge, who has lately succeeded to the chairmanship of the company.

◇ ◇ ◇

Mr. J. K. Brown, Assistant District Manager of the Eastbourne unit of the South Eastern Gas Board, is relinquishing his post with the South Eastern Gas Board and taking up an appointment with Evered and Co., Ltd., of Smethwick. He will represent the company in the areas of the Eastern, Southern, South Eastern, South Western, Wales, and West Midlands Gas Boards, thus maintaining contact with the industry, which he joined in 1934. Mr. Brown is the third generation of his family to serve in the gas industry.

◇ ◇ ◇

Mr. G. W. Martin, who recently retired from the position of Engineer and Manager of the Houghton-le-Spring unit of the Sunderland division, Northern Gas Board, was presented with a clock to mark the occasion at the annual dinner of the unit sports and social section. Mr. Martin served the gas industry for more than 40 years. He began work with the Houghton-le-Spring Gas Company, rose to the position of Engineer and Manager, and after nationalisation continued in the same capacity with the unit. The presentation was made by Mr. W. Moss, longest serving employee in the unit, who has been a gas fitter for 30 years.

◇ ◇ ◇

Mr. L. W. Andrew, B.A., B.SC., has been appointed by the North Thames Gas Board as Senior Technical Officer at Watson House, Fulham. Mr. Andrew was educated at King Edward VI Grammar School, Nuneaton, and Oriel College, Oxford, where he took a First Class Honours degree in chemistry. He joined the research staff of the Gas Light and Coke Company in 1929, and was in charge of the space heating laboratory until 1948, since when he has been the officer in charge of the hot water laboratory. His work in the laboratories has included research on refrigeration, and during the war this research was extended to include some industrial applications of gas. The author of several technical papers, Mr. Andrew is a Gold Medallist of the Institution of Gas Engineers for a paper of which he was a joint author. In 1946 he was president of the London and Southern Junior Gas Association.

Diary

Dec. 18.—Institution of Heating and Ventilating Engineers: Joint meeting with Institute of Fuel, East Midlands Section, at 6.30 p.m.; 'Plant Control through Instruments,' J. E. O. Breen.

Jan. 2.—London Juniors: Paper by W. G. Phillips, M.A., 178, Edgware Road, W.2, 6.30 p.m.

Jan. 6.—Midland Juniors: 'Recent Developments in Domestic Heating Research,' Dr. J. Shack, Birmingham.

Jan. 6.—South Eastern G.C.C.: Caxton Hall, Westminster, S.W.1, 2.15 p.m.

Jan. 7.—Manchester Juniors: Evening Meeting at Manchester Showrooms; Short Papers for the F. Johnston Prize.

Jan. 10.—Scottish (Western) Juniors: Meeting at Heriot-Watt College, Edinburgh. Address by Dr. E. A. C. Chamberlain, Chief Scientific Officer, National Coal Board.

Jan. 12-13.—Women's Gas Federation: Eighth Branch Conference, Caxton Hall, Westminster, S.W.1.

Jan. 6.—East Midlands G.C.C.: Victoria Station Hotel, Nottingham, 11.30 a.m.

Jan. 7.—Institution of Heating and Ventilating Engineers: 'The Design of Coke Burning Appliances,' Dr. F. J. Eaton (North Thames Gas Board); at the Institution of Mechanical Engineers, Storey's Gate, S.W.1, 6 p.m.

BRITISH TAR CONFEDERATION

AT the annual general meeting of the British Tar Confederation on November 27, the following were elected as officers for 1952-53: *President:* Sir Walter Benton Jones, Bart. *Hon Treasurer:* C. E. Carey. *Chairman of the Executive Board:* W. K. Hutchison. *Vice-Chairman:* Major A. G. Saunders and R. H. E. Thomas, O.B.E.

The Executive Board consists of ten representatives nominated by each of the Association of Tar Distillers, the British Association of Coke Oven Tar Producers, and the Gas Council, and one representative nominated by the Low Temperature Coal Distillers' Association. The following constitute the Board for 1952-53:—

Association of Tar Distillers: L. W. Blundell (North Thames Gas Board), C. E. Carey (South Eastern Gas Board), E. Hardman (E. Hardman, Son & Co., Ltd.), Capt. W. Harriss (Prince Regent Tar Co., Ltd.), C. Lord (Lancashire Tar Distillers, Ltd.), Wm. McFarlane (Scottish Tar Distillers, Ltd.), S. Robinson (Midland Tar Distillers, Ltd.), Major A. G. Saunders (Burt, Boulton & Haywood, Ltd.), L. Shuttleworth (Dorman, Long & Co., Ltd.), W. A. Walmsley (Thomas Ness, Ltd.).

British Association of Coke Oven Tar Producers: Lt.-Col. P. F. Benton-Jones (United Coke & Chemicals Co., Ltd.), A. Bradbury (Staveley Iron & Chemical Co., Ltd.), G. W. Bradley (National Coal Board, East Midlands Division), W. Robson Brown, M.P. (Richard Thomas & Baldwins, Ltd.), K. McK. Cameron (Stanton Ironworks Co., Ltd.), F. W. O. Doddrell (National Coal Board, North Eastern Division), C. F. Dutton (National Coal Board), C. M. Frith (South Yorkshire Chemical Works, Ltd.), C. F. Sullivan (National Coal Board, South Western Division), R. H. E. Thomas, O.B.E. (National Coal Board).

Gas Council: S. Black (Northern), F. Boardman (Wales), D. D. Burns (Scottish), W. Hodkinson, O.B.E. (North Western), W. K. Hutchison (South Eastern), H. F. H. Jones, M.B.E. (Gas Council), A. W. Lee (East and West Midlands), A. McDonald (North Eastern), M. Milne-Watson (Eastern and North Thames), S. E. Whitehead, O.B.E., J.P. (South Western and Southern).

Low Temperature Coal Distillers' Association: Commander Colin Buist, M.V.O., R.N. (retd.).

Plenty of Hot Water is an essential to the efficient and hygienic running of the modern hotel bar. Instantaneous gas water heaters have been installed in a large number of the Butler Houses (W. Butler & Co., Ltd., the Wolverhampton brewers) in the Midlands, and 90% of them are Ascots, mainly of the 503 sink type. Similar appliances are installed in many other public houses in Britain.

Glasgow Rejects Electricity Board's Offer

THE SOUTH-WEST SCOTLAND ELECTRICITY BOARD made a bid to have the 2,066 houses at Garthamlock site, Carntyne, reserved as all-electric houses and, in a letter to the Glasgow Corporation Housing Committee, extolled the advantages of electricity over gas. An installation charge of £15 per house is made by the Board, but where electric cookers are installed this charge is reduced to £3. They quote estimated costs of installation in an all-electric house at £34 10s. and in a gas-electric house at £43 5s., showing a balance in favour of the all-electric house of £8 15s., or a total saving of £17,500 on a scheme of 2,000 houses.

They also claim that, from the consumers' point of view, the all-electric house is cheaper to run, and quote estimated figures for a family of four persons showing an annual saving to the tenant of the all-electric house of £1 13s. 2d. or a saving to 2,000 tenants over 20 years of £66,333. Mr. A. G. Jury (Director of Housing) quoted comparable figures showing a saving of only £3 per house in favour of the all-electric house.

The Housing Committee decided in favour of providing both gas and electricity in the Garthamlock scheme.

The North Thames Gas Board, on Monday, December 1, sold 330 mill. cu. ft. of gas—the highest sale yet recorded, and which exceeds the previous best figure (329 mill. cu. ft. on February 4, 1952).

Women's Gas Federation

THE EIGHTH BRANCH CONFERENCE of the Women's Gas Federation will be held on January 12 and 13. Commencing at 2.30 p.m. on the first day there are alternative visits to J. Lyons and Co., Ltd., Cadby Hall; the gas exhibition at the Building Centre; or the gas installation at the Royal Festival Hall. At 5 p.m. the President of the Federation (Miss K. M. Halpin, O.B.E.) will hold an informal reception at Gas Industry House.

The second day will be devoted to talks and discussions and to a special general meeting at the Caxton Hall, Westminster, S.W.1.

The Price of Gas in Dublin has been increased by 1¼d. a therm, the Minister for Industry and Commerce having acted on the recommendations of the Prices Advisory Body. This brings the price up to 1s. 11d. a therm. The increase is due entirely to increased costs of wages and coal.

The Third Annual Report of the North Thames Gas Consultative Council was incorporated in the recently published annual report of the North Thames Gas Board. In order that it shall have wider publicity among consumers in the area the Council has issued the report as a separate 8 pp. publication, and Mr. W. Elliott, Secretary of the Council, asks us to say that copies are available to any member of the public who cares to apply to him at the offices of the Council at 19, Sheffield Terrace, Kensington, W.8.

DUKE OF EDINBURGH VISITS ELECTROLUX

The Queen and the Duke of Edinburgh recently spent the week-end as guests of Major-General Sir H. A. Wernher, BT., G.C.V.O., Chairman of Electrolux, Ltd., at Luton Hoo. On the following Monday, the Duke made a private visit to the Electrolux works at Luton and is here seen watching one of the many welding operations in the manufacture of a refrigerator cooling unit in company with Mr. W. R. Lackie (Works Manager), Major-General Sir H. A. Wernher, and Mr. S. Broughton (Managing Director).

NORTH THAMES COLLIER LAUNCHED

Photograph taken at the launching at Grangemouth of M.V. Falconer Birks

AS mentioned briefly in the *Journal* of December 3, the North Thames Gas Board's new up-river collier, the m.v. *Falconer Birks* was launched at Grangemouth, the naming ceremony being performed by Mrs. Birks, wife of Mr. F. M. Birks, C.B.E., Deputy Chairman of the Board, after whom the collier was named. The *Falconer Birks* is the first to be launched of the seven new colliers on order by the Board. It is the twenty-fifth collier owned by the Board and brings the total carrying capacity of the Board's fleet to nearly 70,000 tons.

The vessel is 270 ft. 6 in. long (length B.P. 257 ft.) by 39 ft. 4 in. beam by 18½ ft. in depth, and has a deadweight of over 2,700 tons. With a speed of approximately 11 knots when loaded, the *Falconer Birks* is powered by an eight-cylinder Clark Sulzer diesel type marine oil engine which develops, in service, 1,150 b.h.p. at 225 r.p.m. Ample accommodation, including single berth cabins for each member of the crew, has been provided. The latest navigational aids are being incorporated in the vessel's equipment, including such special features as Radar and Decca navigator and echo sounder.

Among those present at the launching ceremony were Mr. F. M. Birks, Mr. G. H. Jones, Mr. and Mrs. C. H. Blackford, and Mr. H. S. Rowstron, of Stephenson Clarke, Ltd., and Mr. Aikman, of the Grangemouth Dockyard Co., Ltd., who was accompanied by his wife and daughter.

Talk to Hawick Rotarians

AN interesting survey of the nationalised gas industry was given in a talk to Hawick Rotarians recently by Mr. R. H. Bone, Commercial and Sales Officer to the Scottish Gas Board. He said that Government control was not new in the gas industry, for as far back as 1847 legislation was introduced with obligations regarding supply, quality and price. Consequent on nationalisation the country was split up into 12 areas, with Scotland as one unit—the largest geographically and the sixth largest from the point of view of gas output. The organisation was decentralised as far as possible, the local managers having a full measure of responsibility. Scotland was divided for administration into seven divisions.

Overall demand for gas was now 60% higher than in 1938. In Scotland new mains were being laid at the rate of 100 miles per annum, and this rate would have been greater if the supply of piping had permitted. Last year over 120,000 new appliances had been connected.

At the end of the talk many questions were asked and an interesting discussion ensued on such subjects as the price of coke, safety, cost of appliances and the possibility of gas grids. In this connection Mr. Bone stated that, wherever the local circumstances justified the capital expenditure, it was the policy of the Board to connect neighbouring towns and that a number of grid schemes had been completed or were projected.

RESIDENTIAL EDUCATIONAL COURSES

TWO residential educational courses were held in the West Midlands during November. The first, on 'Modern Developments in Gas Engineering Practice,' took place in Birmingham from November 10-12, and was attended by eighteen engineers from the seven divisions of the West Midlands area. Those attending were welcomed on the first evening by Mr. G. le B. Diamond (Chairman of the Board) who gave a talk on policy and probable future developments, and this was followed by an informal discussion.

On the second day, Mr. H. Moys (Production Engineer) spoke on 'Gas Production in the West Midlands,' and Mr. S. K. Hawthorn (Divisional Engineer, Birmingham) dealt with the special features of the new Swan Village works at West Bromwich. In the afternoon a visit was paid to the new works, and in the evening a lecture on 'Preventive Maintenance' was given by Mr. R. L. Tarratt (Mechanical Engineer, Birmingham).

On the final day of the course Mr. E. T. Pickering (Area Chief Chemist) dealt with the subject of purification and Mr. F. Bengough (Engineer of the Windsor Street Works, Birmingham) spoke on coke production and handling. The course ended with a paper by Dr. R. Long, of the Chemical Engineering Department of Birmingham University, entitled 'Recent Developments in the Fuel Industries.'

The second course was concerned with fuel technology and was held at Leamington from November 17-20. This course continued the series organised for sales and service personnel and had special reference to coke and coke burning appliances.

Mr. J. Tudor Rees (Sales and Service Manager) welcomed course members on the opening evening, and during the three days of the course lectures on the technical aspects of the manufacture, preparation and properties of coke were given by Mr. E. T. Pickering, while Mr. D. Maddocks (Coke Manager) dealt with marketing. A paper on 'The Domestic Angle' was given by Mr. H. A. Barron (Chief Coke Salesman, Birmingham), and Mr. N. Jeffs demonstrated coke burning appliances in present day use and dealt with the principles of their construction and installation. During the course a visit was paid to the Board's Central Laboratories in Birmingham where coke burning appliances were seen on test.

The residential nature of the course gave opportunities to the thirty-six members who attended from different parts of the Board's area for discussion and exchange of ideas, and a number of useful suggestions were put forward to further the sale of coke.

IN PARLIAMENT

Nationalised Industries (Parliamentary Questions)

THE comparative immunity which the nationalised industries enjoy from the searching criticism of Parliamentary Questions is as much the envy of less sacrosanct Departments of State as it is a source of irritation to those who would have no person or industry inviolate. The subject was aired in the Commons on December 5 when the House debated a motion urging that hon. Members be given greater freedom to ask questions relating to the nationalised industries.

Sir EDWARD BOYLE (Birmingham, Handsworth) moved:

> That this House, whilst recognising that the public corporations which control the Nationalised Industries should enjoy that large degree of independence in matters of current administration which is vital to their efficiency as commercial undertakings; none the less urges that honourable Members should not be precluded from placing Questions on the Order Paper relating to the nationalised industries, provided that, both, the subject matter of any such Question is not confined to administrative detail, and the same Question has not previously been asked.

He said he proposed to raise only one issue—that referred to in paragraph 9 of the Select Committee's report—namely, the present practice whereby when a Minister has refused to answer a question bearing on a nationalised industry, no further question on the same subject can normally be accepted by the Table during that session.

Cause of Anxiety

The present practice of the House caused anxiety because they had few opportunities for discussing nationalised industries. The exclusion of whole blocks of questions was a serious matter. He was not disputing that particular matters of day-to-day administration should be excluded from the Order Paper; but it seemed to him quite clear that a number of individual cases could add up to a rather more important question of administration on which the Minister might be very glad indeed to make a statement, and by giving Ministers rather greater latitude in deciding whether or not to answer Questions on the Floor of the House, they would serve not only the interest of right hon. and hon. Gentlemen but also the interests of the Corporations themselves.

He suggested the Speaker should take into consideration the intrinsic importance of the subject matter of the question and the number of members interested in it.

Mr. H. HYND (Accrington) raised the point of organised questions on a controversial question, but Sir Edward thought the Speaker could take care of that.

Mr. ROLAND WILLIAMS (Wigan), a member of the Committee, said as far as questions of detailed administration were concerned, if responsibilities were bestowed by Parliament upon individuals, the greater the degree of those responsibilities the more important it was that there should be a field of initiative within which the persons who were undertaking the responsibilities should be able to work without undue interference.

The exercise of initiative was something which carried with it the right to make mistakes within certain limits. If that was accepted, it became difficult to see how it would be right to direct Questions on matters of detail in regard to the work of these large commercial undertakings. No business man of experience would tolerate carrying out work in which he was exposed to questions on the day-to-day details of the administration of his company, on which, if he had any initiative at all, he should have the right to exercise his judgment.

Mr. RALPH ASSHETON (Blackburn, West), Chairman of the Committee, reminded the House that the Committee was still sitting and in due course might produce further recommendations.

Powerful Instrument

Mr. PHILIP NOEL-BAKER (Derby, South) recalled that he had to answer questions about transport, gas, electricity and coal and his experience convinced him that a parliamentary question was a very powerful instrument of public control. Broadly speaking, the system of Parliamentary Questions was not the only democratic safeguard, but taken in terms of practical results it was well worth the time and trouble and money it cost. If a Minister was in doubt whether to answer or not, it was always right for him to do so, and by that course he saved a lot of trouble to himself and others, and he even served the public interest. He reached the conclusion that the Questions he had answered in both terms of office did not serve to hamper the administration of the industry and did not cramp the initiative, vigour and enterprise with which managements ought to work. Thanks to the debates and questions, a large number of matters were dealt with which might not have been dealt with so expeditiously or so well by the nationalised boards.

The MINISTER OF FUEL AND POWER (Mr. Geoffrey Lloyd), replying, said he wanted to see those industries which were to remain nationalised thoroughly successful, but they were really discussing a very narrow point since he noted that even Sir Herbert Williams was now agreed that it was unwise for Ministers to answer questions on day-to-day administration. He emphasised the work and difficulties involved in answering questions about public corporations.

The motion was, by leave, withdrawn.

Production of Electricity on Gasworks

Asked by Sir WILLIAM WAKEFIELD (St. Marylebone) at Question Time on December 8, what restrictions were placed by electricity undertakings on the production of electricity by gasworks, the Minister of Fuel and Power, Mr. GEOFFREY LLOYD, replied that he was not aware of any such restrictions.

Pensions

Mr. ELWYN JONES (West Ham, South) asked the Minister of Fuel and Power when he expects to announce his decision as to the making of Regulations to ensure for pensioners of gas and electricity undertakings, formerly owned by local authorities, the benefits of the Pensions (Increase) Act, 1952. A similar question was put by Mr. A. EVANS (Islington, South-West).

Mr. LLOYD said he had this question under consideration but could not yet say when a decision could be announced.

Shortage of Gas Pipes

The question of shortage of pipes was again brought up—this time by Mr. JULIAN SNOW (Stafford), who asked the Minister of Fuel and Power what steps he is taking to see that the West Midlands Gas Board is supplied with cast iron pipes to enable it to carry out its responsibility of maintaining a reasonable pressure to outlying districts from the Walsall gasworks.

Mr. LLOYD observed that cast iron pipes of the size required to increase the pressure of gas supplies are not subject to control, and it was for the West Midlands Board to determine in what parts of its area such supplies as it can obtain may best be used.

Wet Coke

The vexed subject of excessive moisture content in coke deliveries was raised in a question by Mr. P. L. WELLS (Faversham), who asked the President of the Board of Trade what remedy is open to a householder when very wet coke or Coalite is supplied, thereby depriving him of the full weight of fuel for which payment has been made.

Mr. H. STRAUSS stated that the householder can report the facts to his local inspector of Weights and Measures, who will consider whether any action can be taken. In certain areas, he added, there are local Acts under which wilful damping of such fuels is made illegal.

Board Members' Salaries

Mr. F. J. ERROLL (Altrincham and Sale) asked the Prime Minister on December 9 if he would publish in the form of a White Paper an up-to-date comprehensive list of all members appointed to central and regional nationalised boards of a commercial character,

with details of individual salaries, pensions, and expenses allowed, and contract dates, together with a separate list showing all individuals holding more than one appointment; and what those appointments were.

The PRIME MINISTER stated that a White Paper of this character would be published shortly. He would like, however, to take the opportunity of acknowledging the valuable services rendered by those to whom the Question referred.

Asked by Mr. PHILIP NOEL-BAKER (Derby, South) to give some information about the salaries and expenses paid to the directors and managers of the larger financial, industrial, and commercial undertakings carried on under private enterprise, Mr. CHURCHILL said he was not going to embark on a comparison of the cost of running capitalist or Socialist enterprises—but there was, of course, a general feeling that private enterprise managed things much cheaper.

Electricity Tariffs

The basis on which the standing charge in two-part electricity tariffs is fixed has frequently led to criticism.

Mr. DAVID LLEWELLYN (Cardiff, North) asked the Minister of Fuel and Power on what date permissive approval was given to the principle that the number of rooms in a house should form a basis for the assessment of electricity charges, even though some of the rooms are not fitted for electricity.

Mr. GEOFFREY LLOYD replied that in February, 1951, his predecessor approved general principles for the standardisation and simplification of methods of charge which had been drawn up by a Committee of the Electricity Boards. These principles included a recommendation that for the domestic tariff the number of rooms should be generally adopted as the basis of assessment, the Boards being left to adopt standard definitions for the determination of assessable rooms. Where, however, local circumstances made it desirable the boards would have discretion to adopt the floor area as the basis of assessment. These bases of assessment had, in fact, been in common use for many years

Fireguards

Two Questions on the subject of the Heating Appliances (Fireguards) Act, 1952, were put to the Secretary of State for the Home Department on December 11. Mr. BARNETT JANNER (Leicester, North-West) and Mr. GEORGE CRADDOCK (Bradford, South) wanted to know when it was intended to issue regulations specifying the use of fireguards in accordance with the provisions of the Act.

Sir DAVID MAXWELL FYFE said he proposed to use as the basis for any regulations the specification which, in consultation with his Department, the British Standards Institution have prepared for guards for electric and gas fires and oil heaters. This incorporates the standards of guarding contained in the specifications already issued for the construction of gas and electric fires to which the larger manufacturers have been working during the last few months. Sir David hoped the necessary consultations upon the regulations would be completed in such time that he would be able to make them in the early part of the New Year.

Pressed by Mr. JANNER to consider issuing these regulations sooner than the early part of next year, in view of the fact that a lot of accidents occurred round about Christmas time, Sir DAVID said that the standards of guarding these three types of fire involved a number of technical problems on which consultation was very helpful. He promised to do his utmost to get them out as soon as he could.

In answer to a further question by Mr. D. G. BULLARD (Norfolk, South-West), the SECRETARY OF STATE said he would also look into the point of fixing a date after which it would be illegal to sell an unguarded fire.

COMPANY NEWS

MALTA GOVERNMENT TAKES OVER

STOCKHOLDERS of the Malta and Mediterranean Gas Company were informed during the last week of November by Mr. Arthur M. Paddon, Chairman of the Board, that the Malta Government had notified the company that it intended to take over the gas undertaking on November 30. Accordingly, the Managing Director had been to Malta to conduct negotiations with Government representatives. The Government proposed to purchase the consumable stores, movable assets, and meters and cookers in consumers' houses at a valuation.

As regards the mains (which are of considerable value) the Government maintained that these are part and parcel of the works and belong to the Government as from December 1.

The Directors (having obtained legal advice in London and Malta) dispute this and have made it clear that they will have no hesitation in seeking the decision of the Courts if necessary.

Mr. Paddon's circular stated that, despite these difficulties, negotiations had been conducted in a friendly atmosphere and arrangements were being made to have the legal position of the mains clarified by the courts—the Government undertaking to purchase at a valuation if the courts decide in favour of the company. Arrangements have also been concluded for the Government to take over the administration in Malta more or less as a going concern without inconvenience to consumers.

The Directors do not recommend liquidation proceedings until the position has clarified further. They will then call the stockholders together to explain the position in more detail and to pass the necessary resolutions. Definite figures cannot yet be given as to what the proprietors will eventually receive. It is evident from the figures mentioned at the last annual general meeting that the amount divisible will be substantial and should not be less than £225 for each £100 of every class of stock held.

The Directors have considered the effect on the English employees, who in some cases have given long and valued service. Financial arrangements have been made to deal with the matter so as to avoid leaving any liability in this respect to be met when liquidation proceedings commence. Mr. G. Murray Burton, having retired from the position of Secretary on being appointed Deputy Chairman, was granted a retiring allowance in respect of his secretarial services—this allowance has now been commuted. Since he is also a Director, stockholders will be formally asked to ratify the Board's action.

During the past 12 years, when the Company was passing through difficult times, the Directors voluntarily gave up their fees to the value of £8,000. The financial strength of the company at the termination of the concession is largely due to the efforts of the Managing Director.

Mr. Paddon concluded his circular with a suggestion that stockholders might agree to make a voluntary gift to Mr. Murray Burton and the Directors by way of a small percentage deduction from the amount to be distributed. If every stockholder were to agree to the proposal the total amount of the gift would be less than the £8,000 mentioned. He invited an expression of opinion before formally submitting a proposal.

WAILES DOVE BITUMASTIC

Trading profit year ended September 30 £260,405 (£213,247), plus other income £6,341 (£5,770). After depreciation £21,434 (£18,875), tax £145,662 (£105,347), etc., net profit £76,361 (£74,744). To provision for obsolescence of plant and machinery £10,000 (nil), to general reserve £20,000 (£45,000), written off leasehold property nil (£1,006), dividends of 30% (27½%), forward £30,857 (£15,996). Current assets £634,885 (£531,258) including stocks and work £168,530 (£145,434), debtors £230,444 (£191,428), quoted investments £116,249 (£101,272), with market value £108,293 (£99,555); and cash £119,651 (£93,123). Current liabilities and provisions £213,360 (£187,037). Deferred liabilities £130,930 (£85,931). Revenue reserves and surplus £240,857 (£205,996).

WOODALL-DUCKHAM

Commenting recently in the *Financial Times* on the position of Woodall-Duckham shares, 'Diarist' wrote: 'This company has unexecuted orders running into more than £30 mill. If I have seemed to favour the 5s. shares of this company in previous references it may be thought that I have been justified by the subsequent movements in both dividend and share price. For last year the payment was raised by 5% to 20% and this rate, it has been officially foreshadowed, should be maintained despite the incidence of increased taxation. Equity earnings last year were equal to 74%, thereby giving ample cover for the dividend. The shares are now up to 18s. 6d. at which they yield 5.4%—not particularly generous, perhaps, but indicative of the hope that the official dividend forecast may have been phrased cautiously.'

North Thames Consumer Service

ADDRESSING the 33rd meeting of the North Thames Gas Consultative Council at the Westminster City Hall, on November 27, Mr. S. G. Aberdein (Commercial Manager of the North Thames Gas Board) described recent developments in the consumer sales and service side of the Board's activities.

Among the matters of interest to gas consumers, Mr. Aberdein mentioned the standardisation of gas prices and tariffs throughout the North Thames area and the introduction last July of a limitation in the supplementary charge paid by prepayment consumers, whereby this charge ceases to be payable after a limited number of therms have been consumed, and any extra gas consumed is charged at the normal rate.

To meet the convenience of consumers, new showrooms had been opened at Richmond and Newman Street (off Oxford Street), and additional showrooms were contemplated at High Wycombe and Uxbridge. The need for new showrooms in the new towns of Bracknell (Berks) and Basildon (Essex) was also under consideration. Redundant and uneconomic showrooms had been closed at Eton Wick, Leigh-on-Sea (Madeira Avenue), and Mill Hill gasworks. During the past year 4,719,000 transactions had been dealt with in the Board's showrooms and in some showrooms service counters had been provided where consumers could obtain spare parts of gas appliances and get minor repairs carried out without delay.

Reducing Black Cookers

The sales of modern gas cookers by the Board had been very successful, and the Council was interested to learn that eight out of 10 incoming tenants of new dwellings erected by local authorities in the Gas Board's area had chosen gas for cooking. Another interesting fact was that the number of black iron cookers installed in the Board's area had been reduced from 286,000 in 1945 to 60,000 in 1952. Besides saving gas to the consumers who had replaced these cookers with more modern appliances, this had led to a saving over the period mentioned of 195,000 tons of coal used for gas-making. The annual saving in coal was now about 55,000 tons.

Attention was called to the restrictive effect of purchase tax and the Hire Purchase Control Order, 1952, on the sale of gas water heating appliances and gas washing machines. It was suggested that makers of these appliances had been hit so badly that there was a possibility of their being put out of business. Gas refrigerators were more freely available and could now be supplied on demand.

The new types of gas-ignited solid fuel grates were selling very well and over 95,000 had been installed in post-war dwellings in the Board's area alone. The Board regretted, however, that several local authorities were ordering these grates without the integral gas burner for igniting the solid fuel, because they were unwilling to pay the small extra charge involved. The extra cost was only some five or six shillings and the burner was a great boon to the tenant.

In conclusion, Mr. Aberdein referred to the many ways in which the Board was trying to keep down costs without sacrifice of efficiency and service to consumers.

The Council considered and accepted the Gas Board's reply to its suggestions for giving more adequate publicity to gas tariffs and alterations in the price of gas. In future, changes in the price of gas as they occur will be displayed in the Board's showroom windows and the Board will also make special arrangements for calling the attention of consumers to the special two-part tariff for domestic consumers, where this is applicable.

The Council also considered whether any action should be taken on a suggestion that the Board should issue a notice to consumers warning them to turn off the gas supply after use at the *inlet* end of a flexible tube connection. The Board had reported that the number of accidents arising from this cause over the past few years had been few. The Council decided to take no further action, since the number of accidents in relation to the total numbers of consumers in the Board's area was so small. The Council felt however that with a view to minimising still further the number of accidents, gas appliances used with flexible tubing connections should not be supplied with a gas tap on the appliance, thus sometimes leaving the tube charged with gas.

PREPAYMENT CONSUMPTION RECEIPTS

COMPLAINTS that the receipts to prepayment meter users were unsatisfactory led to the question being discussed in detail by the November meeting of the Northern Gas Consultative Council in Newcastle. Alderman Hoy presided.

The Council agreed that the Northern Gas Board should be requested to have the words 'any further information regarding this amount can be obtained from the local office of the Gas Board' printed at the foot of all statements handed to prepayment consumers.

Alderman Hoy told the Council that the matter of the prepayment meter receipt was one which had a long history and which had been discussed from time to time by the Council and its consumer committees. It was first brought before the Council in 1950 and since then two consumer committees had discussed the question. Mr. Arthur Blenkinsop (M.P. for Newcastle-on-Tyne, East) had also brought to the notice of the Board the fact that one of his constituents considered the type of receipt unsatisfactory.

'The complaint is,' said Alderman Hoy, 'that in certain parts of the Board's area when prepayment meters are emptied no receipt is given for the money collected. A printed slip is handed to the consumer showing only the amount of rebate. Consumers feel that they are entitled to know how much money was in the meter, the amount of gas consumed and the cost of it, together with the amount of the rebate.'

Mr. J. F. Jackson (Secretary of the Board) pointed out that for a number of reasons complete uniformity could never be achieved. The method adopted in each unit depended upon whether the unit operated the 'blind' or 'open' system of meter reading. 'Blind' meter reading was essential from a security point of view, but it ruled out any question of giving a receipt on the lines suggested by the Council.

The 'blind' system was operated in larger units, said Mr. Jackson, but in the smaller units, where there was probably only one collector, the 'open' system had to be operated. Under this system a booklet was left with the consumer which gave all the facts—meter reading, total cash received, discount, and net amount—and thus provided a continuous record of a consumer's consumption and payments. If a receipt were given covering all the details the Council wanted it would raise the question of stamp duty.

Mr. Jackson pointed out that the meter was generally emptied in the presence of the householder and the rebate handed over, so that in most cases the consumer was fully aware of the contents of the meter. He thought that it would be a pity to depart from well-established systems to a more costly one for the sake of the very small number of consumers who wanted additional information.

A Safer System

Mr. F. Bunting (Chief Accountant) said that he had spent some considerable time discussing the question with divisional general managers. The 'blind' system did not give all the information the Council wanted, but it was the safer system from the Board's point of view. With the 'open' system of meter reading it was difficult to get a uniform method to fit in with every unit's accountancy system. Some units were mechanised, others were not, and it was not easy to arrive at any particular system. It must be decided how far the 'blind' system could be applied, but he agreed that it did not give all the information that the occasional consumer called for.

After a full discussion, Alderman Hoy said that he was desirous of meeting the wishes of the Council that the smallest consumer should be fully safeguarded. He did not want the problem to create the impression in the public mind that it was of major importance. The Board should not be saddled with extra costs, and he thought the most practical suggestion was that a note should be put on statements to prepayment meter consumers notifying them that if they wanted further information regarding the contents of the meter they could get it from their local office.

Sales Trends in West Midlands

SINCE September there has been a slight increase in sales of gas in the West Midlands, following an all round decrease of 1.1% over the preceding 12 months. Reporting to the West Midlands Gas Consultative Council at Birmingham on December 1 on the work of the West Midlands Gas Board for the past six months, Mr. G. le B. Diamond, Chairman, stated that gas made and purchased during the half year totalled 30,912,713,000 cu.ft., a decrease of 2.1% compared with the corresponding half year of 1951. For the full 52 weeks the total was 69,645,158,000 cu.ft., a decrease of 1.1%.

The period under review included the spring and summer months and covered the time when restrictions on supplies of some raw materials were beginning to make themselves felt and brought about some decline in industrial activity. This had had a reflection on the output of gas. Present trends indicate that the sales of gas over the current financial year will closely approximate to those of 1951-52.

Adequate Coal Stocks

Adequate supplies of coal during the six months enabled a stock of nearly 396,000 tons to be accumulated by the end of September, some 80,000 tons more than at the corresponding date in 1951. Consumption for gas making in the 26 weeks was 1,379,700 tons. The Board started the winter period with more adequate stocks than at any time since vesting day.

Coke stocks at September, 1952, were 105,700 tons compared with 17,500 tons in 1951. Sales in the 26 weeks were 425,900 tons against 481,600 tons, a decrease of 11.6%. Sales in the full year to September, 1952, were 1,047,900 tons against 1,127,900 tons, a decrease of 7.1%.

The stock position was favourable, having reached the target planned by the end of the summer period. Sales during the latter part of October were higher than any corresponding period since nationalisation. The most gratifying feature was the substantial increase in sales to the domestic market, despite plentiful supplies of other domestic fuels available. It was hoped that sales would not only be maintained but would be increased during the winter, given normal weather conditions.

Construction of new manufacturing plant proceeded slowly during the summer owing to the inability of the Board to obtain all the steel needed for carrying out its development plans. Approximately 50% of the Board's steel requirements were met, but until the steel supply position improved it was quite impossible to speed up the provision of new production plant so urgently required. The Board's policy had been directed to the completion of the construction of production plant already well advanced and likely to come into use at an early date.

The net total gasmaking capacity added during the six months was 1,316,000 cu.ft. per day and the extensions authorised during the same period would provide for an additional 3,640,000 cu.ft. per day. The estimated cost of the major items of additional plant authorised amounted to £408,748.

Price Protests

Representations were made to the Council on the price of gas by a deputation on behalf of a number of districts including Lichfield, Leominster, Tamworth, Bridgnorth, and Cannock and also by a Staffordshire County Council delegate. A complaint having been made to the Gas Board the deputation jointly made an appeal to the Consultative Council.

Alderman A. L. Garratt (Lichfield) said they had all been very unfairly treated in this matter of gas prices. The authorities for all of whom he was speaking were deeply concerned. It was recognised that the costs of the production of gas had very largely increased, but their case was that the cost to them had been increased far and away more than in other parts of the West Midlands.

He stressed particularly the disparity in charges for Lichfield as compared with Birmingham and Stoke-on-Trent and other parts of the country. He cited Lichfield but explained that the disparity also referred to the other authorities represented. He suggested there was a greater variation between the highest and lowest in the West Midlands than elsewhere. They paid more for gas than anywhere else in the area or in the country except one place, Weymouth on the south coast. He thought that was the negation of the object of nationalisation which was designed to bring about uniformity in price. He thought it was neither fair nor commonsense that Lichfield on the edge of a great industrialised area should have to pay so high a price for gas.

The Chairman (Alderman W. H. Malcolm) pointed out that there were two sides to every question and they would have to get a report from the Gas Board, and then the Council could discuss the matter and communicate with them again.

Alderman Lewis said they all wanted to see justice done and they must hear both sides, but the deputation could be assured that members of the Council would not just sit there like dummies.

Alderman W. Neville (Staffs. County Council) said the Overspill Committee wanted to protest against the disparity in prices. They had a big problem as they were expected to house the overspill from all the local authorities in the south even including Birmingham and this affected what they could give them in the way of housing and the amenities of life. As planning authority they had to see a fair share was paid towards the development of the life of the community and they looked with anger on such disparity in charges as they were made in the West Midlands at the present time. There was certainly more than one side to the matter, but what they wanted was the side that was right.

A Serious Penalty

Councillor Hampton (Cannock) said they had a firm of bakers who paid the high price and had to compete with other districts where competitors paid less. That was regarded as a serious penalty for their having the bakery at Cannock. It was a fundamental principle of public ownership that there should be equality as between consumers.

The Town Clerk of Lichfield commended the example of the Electricity Board which had introduced a uniform charge throughout the area.

The Chairman said they appreciated the troubles which had been brought forward by the deputation, but the facts must be investigated and when that had been done the Council could discuss the matter and further communication would be made with the deputation.

GLASGOW PRESSURE COMPLAINT

COMPLAINTS OF REDUCED GAS PRESSURE in Glasgow, particularly in the north western area during the cold snap, were brought to the notice of Glasgow Corporation on November 27 in a telegram from Drumchapel Residents' Association. The telegram expressed grave concern, especially as regards danger to life arising from the fluctuating supply. This concern was echoed by members and it was agreed that the Lord Provost should make representations through the Consultative Council.

Later an explanatory statement was made by Mr. D. F. Young, Controller of the Glasgow Division of the Scottish Gas Board. The reduction in gas pressure, he said, was the result of the cold weather and an extremely high demand since the previous Friday. The supply in the gasholders had become very low, and the shortage had been accentuated by the necessity of laying off one of the main gas boosters for attention to the driving motor. During the week, however, increased production was being obtained from additional plant which had been under repair during the summer, and the position was improving every day.

On the Monday, he added, the output of gas was 3 mill. cu.ft. more than on the corresponding day last year. The delivery had been considerably increased since the beginning of November and over last week-end it was 2 mill. cu.ft. per day over last year's figures.

AMERICAN SPOTLIGHT

Items of Topical Interest from the Contemporary Technical Press of Canada and the United States

ANOTHER RECORD

USE of gas by electricity power plants during last August exceeded 100,000 mill. cu.ft. for the first time—reaching a new record of 104,965,791,000 cu.ft. These figures were reported in the Federal Power Commission's monthly publication, 'Consumption of Fuel for Production of Electric Energy.'

The August total represents a gain of 6.3% over the previous record of 98,709,939,000 cu.ft. used in the previous month and was 18.7% above the amount used in August, 1951. (*A.G.A. Monthly.*)

* * *

THEY ALSO WAIT . . .

SHARPLY increased demand for domestic and industrial gas equipment continues to create a materials supply problem for the gas appliance industry in America.

Despite recent signs that the Government is relaxing its control over materials, the Gas Appliance Manufacturers' Association reports that allocation of steel and other metals to various branches of the industry still remains 'out of balance.' Producers of gas ranges, heating systems, refrigerators, water heaters and other domestic equipment are only 'slightly better able' to keep up with demand than they were at the start of the year, according to Louis Ruthenburg, President of GAMA.

Too many manufacturers of essential goods, he said, are still obliged to sit on unfinished goods while waiting for missing parts. Apparently there is now a better balanced schedule of defence production. This may mean that essential civilian industry can expect more equitable allocations of metal. (*American Gas Journal.*)

* * *

A.G.A. LABORATORIES

PLAYING an important part in the growth and development of the gas industry, the A.G.A. Laboratories facilities for service to the industry are rapidly expanding to meet the growing need. Additional interior facilities have been completed, since the official opening of the 21,000 sq.ft., two-story shell. These provide enlarged reception rooms for visitors and manufacturers, improved telephone and intercommunication service, appliance assembly rooms, enlarged appliance description department and storage and shipping areas as well as a large covered shipping dock for off-street loading.

Most recently completed has been the construction of a number of appliance assembly rooms, to provide visiting manufacturers a place to assemble, adjust and make minor alterations on gas equipment prior to approval tests. Each room has been furnished with gas metering equipment and work surfaces and supplied with water, electricity, and all types of gas.

The new structure was built to relieve the over-crowded conditions of the laboratories and serve the rapid expansion taking place in the industry. Constructed at a cost of approximately $240,000, this addition represents the third major expansion since the founding of the laboratories in 1925. It brings the total investment in plant and facilities to over $875,000. (*A.G.A. Monthly.*)

* * *

DEALER CO-OPERATION

A COMPREHENSIVE programme of appliance merchandising and dealer co-operation can be of inestimable value to an alert gas utility. Through the operation of such a plan, it is possible to maintain adequate standards of equipment, prices and terms. Properly designed and vitally pursued, it will boost public demand for gas and gas appliances, and enable the utility to extend gas sales in critical competitive markets.

At least one dealer should be enrolled in each business centre of the territory the utility serves. This dealer should stock and display a full line of any one or more manufacturer's products.

Periodic dealer meetings should be held at least every three months, to co-ordinate and encourage the operation of the plan. During these meetings the utility can assure the dealers of its sincere determination to improve its merchandising operations, to iron out problems that might arise and to get ideas from them that will help advance the sale of gas. The dealers will be spurred to greater sales effort through the discussions and the inspirational talks at these meetings. (*A.G.A. Monthly.*)

* * *

GAS RANGES FOR SCHOOLS

THE contribution of 93 laboratory-sized gas ranges, designed especially for school home economics classes, is the latest step in the Seattle Gas Company's public relations programme. The utility has offered to replace all gas ranges in public schools at no cost this year, and every two years thereafter.

Manufactured to the utility's specifications, the new 'Seattle Miss' model is the first laboratory-sized range made with all the de-luxe, automatic features of modern gas range. It has four centre simmer burners, full size oven and broiler, and an oven with glass door and light.

N. Henry Gellert, the Seattle utility's president, initiated the plan because he felt that school budget limitations too often prevent replacement of obsolete with modern equipment, so important in teaching tomorrow's homemakers. (*A.G.A. Monthly.*)

$110 MILL. LOAN

THE biggest loan cheque ever drawn by the Prudential Insurance Company of America and, incidentally, the largest loan ever issued by that company to any utility company, was recently paid to the Lone Star Gas Co., Dallas.

Of this loan of $110 mill., $85 mill. will go to extinguishing the whole of the currently outstanding funded debt, while part of the remaining $25 mill., combined with revenue derived from operations, will be used for reinforcements and additions to physical properties throughout the company's territories in Texas and Oklahoma. (*Gas Age.*)

* * *

DETECTING WELDING ERRORS

PRODUCTS of the atomic pile have revolutionised methods of inspecting pipe line welds. A tiny aluminium capsule an inch long and less than half an inch wide, containing less than a gramme of radio-active material, infallibly detects a welder's errors and saves countless thousands of dollars.

This new method of weld inspection was introduced about five years ago and the experience accumulated in that period now permits an appraisal of its value to the gas industry. The records show that its application has not only saved money but has raised the skill and fidelity of the welders, has reduced leakage, and has contributed to safety.

The method is known as gamma ray inspection or radiography and consists of the comparatively simple process of placing the source of radiation inside, or in some cases outside, the welded seam, with a radiographic film on the opposite side. Exposure time depends on the source of radiation, the thickness of the pipe walls, and the diameter of the pipe. The films are quickly processed on the construction site and any welding defect is immediately revealed. Each welder's work is tested at least once every day to make sure he is not deviating from the accepted weld technique. (*Gas Age.*)

* * *

WELDING AMERICA

HIGHLIGHT of the recent Midwest Industrial Gas Council meeting in Chicago was a film portrayal of the construction of the new natural gas pipe line from Texas to the Chicago area. The film in sound and colour, 'Welding America,' was presented by Mark V. Burlingame, vice-president, Natural Gas Pipeline Co. of America and Texas Illinois Natural Gas Pipeline Co.

Before running the film, Mr. Burlingame told of some of the problems involved in constructing the line. He said that the total cost would be $185 mill. and that 500,000 tons of steel would be required. (*Gas Age.*)

PLANT SELECTION AND COKE OVEN GAS SUPPLY

By F. G. PYPER, M.A., M.Inst.Gas E., A.M.I.C.E.
Divisional Engineer, Sheffield and Rotherham Division East Midlands Gas Board

From a paper at a joint meeting of the Institution of Gas Engineers and the Coke Oven Managers' Association, October 29, 1952

WITH the beginning of the second world war, an era ended for the Sheffield Gas Company. From the advent of coke oven gas on a large scale, the sales of gas had been expanding and the increases met by connecting additional coking plants to the grid. This source of gas was practically exhausted by 1939.

Between 1945 and 1949, some consideration was given to schemes to increase the supplies of gas in Sheffield, and two large water gas plants were ordered in 1948 for the Neepsend works. Experience has since confirmed that this decision was unwise. Orders were also placed for an intermittent vertical chamber plant at Grimesthorpe works and for additional holders at various works owned by the Company. Although these plants are well suited to meet the unusual load conditions in Sheffield and the acceptance of purchased coke oven gas, it is unfortunate that the decision to place the orders was so long delayed by the former Company that there will be no benefit from them for another two years.

When the East Midlands Gas Board took over the Sheffield Gas undertaking it was faced with a problem of first magnitude. There had been rationing of gas for the previous three years, and the steel industry was becoming increasingly and justifiably restive. After vesting date, the quantity of gas available was increased by the Board, but only in decrepit plant and at a high cost of manufacture.

In forming the Sheffield and Rotherham division, the Board brought in Rotherham, Doncaster, and other smaller undertakings, but it was quickly apparent that, with the same type of load at Rotherham, no fundamental difference in the approach to the problem of plant selection was necessary.

Background and First-Aid Measures

Great development of the industrial load was made possible by the advent of gas at a price competitive with cruder fuels.

During the '30s, the rapid increases in demand were met by connecting up coking plants to the grid until a limit of about 35 mill. cu.ft. a day was reached. This is a very different figure from the 80 mill. cu.ft. put forward in the Area Gas Supply Report prepared in 1930 by the Board of Trade Committee under the chairmanship of Sir Alexander Walker, which led to the opinion, then expressed, that gas would never again be made in Sheffield. The amount of gas from coking plants now available for disposal in the division is about 50 mill. cu.ft. a day.

The manufacture of gas in Sheffield did in fact become a very pressing problem in the early days of the second world war, and, except when the load was deliberately restricted, has so remained. To meet the increases in demand, it has been necessary to work with the narrowest of margins and to use plant that, except for two water gas units, is obsolete and inefficient.

The situation was reviewed, after vesting date, to see how far it was possible to lift the restrictions on gas consumption, and the following steps were taken:—

(1) A connection was made between Rotherham and Sheffield, and a compressor installed. This brought a little surplus carburetted water gas from Rotherham, and the quantity was shortly afterwards greatly increased when two new carburetted water gas plants and a holder, nearing completion at vesting date, were put to work there.

(2) Certain gas undertakings were taking gas from the coking plants supplying Sheffield, and had a prior claim on that gas, so that, in effect, the Sheffield plant was carrying the load variations of these undertakings. By extending to works connected to the coke oven gas grid the control already exercised over the Sheffield works, particularly the control of gas stocks, a substantial addition to the gas available during the working week was possible.

(3) In Sheffield, an old retort house which had not been in operation for some years was put to work, and production was stepped up in another.

(4) Stand-by water gas plant at some of the smaller works were brought into operation.

(5) A small quantity of additional coke oven gas was later negotiated on a short-term basis. It was replaced at the coking plant with pitch creosote at a correspondingly higher price, which the Board had to meet.

As a result of these measures, the Board has met in full current demands for gas, except on a very few isolated occasions.

During the coming winter, the benefit of the new carburetted water gas plants (capacity 9½ mill. cu.ft. a day) will be felt. A further supply from a coking plant, negotiated at a special price, will become available when the underfiring producer gas plant, now being erected, has been completed.

It must be realised that, of each of these measures to obtain more gas, only (2) is an economic answer to the supply problem in Sheffield.

Incidence of the Load

(A) Annual

Between 80 and 90 per cent. of the gas sold in Sheffield is supplied to industry, mainly the steel industry; indeed, the daily consumption of some of the larger firms is counted in millions of cubic feet. The effect of this is to give a most unusual, but very satisfactory, annual load factor.

Even taking as the maximum the exceptional 'bull' week before Christmas, when overtime is extensively worked, the ratio of the average week to the maximum week is 0.87, or, omitting the five holiday weeks the ratio is 0.90. The weather and the atmospheric temperature have only a very limited effect on the consumption of gas. Working on a very good load factor, an unusually high proportion of cheap base-load gas can be used.

(B) Weekly

If the daily outputs throughout the week are considered, a very much less satisfactory situation is revealed. The industrial load is at its greatest between Monday morning and Friday evening, and relatively light at the week-end. The stocks of gas must, therefore, fall during the week to allow for storage at the week-end, when the load is reduced (Fig. 1). This means in effect that the greatest outputs are restricted to 4½ days in each week. In practice, Monday is the heaviest day, with a general tendency to fall during the week until Friday, which is the lightest working day.

For the sake of convenience, however, the comparisons are made between the average week-day (Monday to Friday inclusive) and the average week-end day (Saturday and

Sunday). The ratio between the average week-end day and the average week-day may be called the week-end load factor. At present, the factor in Sheffield is running at about 0.5.

(c) Daily

As the gas stocks vary less throughout the 24-hour periods than throughout the weekly periods, there is no need to consider the hourly variations in relation either to plant selection or to gas storage capacity.

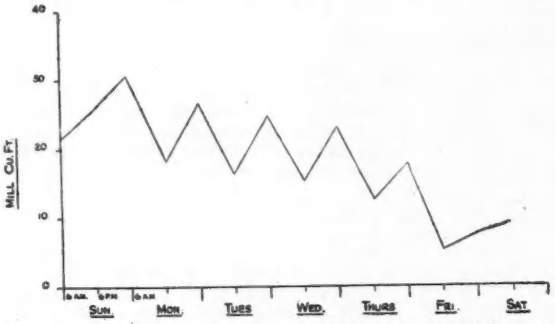


Fig. 1. Gas stocks at 12-hour intervals for Sheffield only during a week in February, 1952.

Plant Characteristics Required

To meet these load requirements, consideration must be given to the following points:—

(1) With such a very high proportion of industrial load, the gas must be provided to sell at a competitive price in relation to other fuels—*e.g.*, oil, producer gas, etc.

(2) Base load must form the bulk of the supply, and indeed, if repairs could be spread evenly over the years, variation of the output of the main plants could be kept to a minimum.

(3) From the weekly load factor, it is clear that, unless an extravagantly large storage capacity is installed, there must be some flexibility in output to take up at least some of the load variation. No provision can reasonably be made to cope with the surplus gas at holiday periods, and the drastic shutting down of plants or the bleeding of gas must then be faced.

Schemes in Course of Development

The high cost of raw materials must rule out the use of carburetted water gas, except to meet extreme peak-load conditions and emergencies. Such plant should form an important part of the divisional equipment, but must be of strictly limited capacity.

The only method of getting the necessary flexibility is to provide carbonising plant with alternative methods of firing (coal gas and producer gas). So far as is known, no such plant, other than the coke oven, has been so built, and, if site conditions and capacity allow, it is the obvious and only choice. The Board is engaged on plans for the erection of a 1,200 tons a day battery on a new site in Sheffield, to be followed by other batteries of similar capacity as required. The experience of the North Thames and South Eastern Gas Boards with this type of plant is very reassuring.

Before vesting date, the possibility of installing a coke oven battery at Grimesthorpe works was considered, but the site made this impossible, and the best substitute, an intermittent vertical chamber plant, was ordered. Further consideration by the Board led to the decision to transfer this plant to Car House works, Rotherham, where again the installation of a coke oven plant had been considered, but rejected due to site conditions, which, though not impossible of use, were very difficult.

In the preliminary discussions with the contractors for the intermittent vertical chamber plant, alternative coal gas firing was requested and will be included. The contractors were not, however, prepared at that time to design a setting to use cold clean producer gas with reversible regenerators of an efficiency high enough to obviate the use of waste heat boilers, although the generation of steam with valuable coke must be deprecated. The settings will therefore be fired with hot gas from external producers, a small proportion of producer gas being used during coal gas firing to maintain gas ducts and regenerators at a safe temperature. This arrangement is a necessary compromise.

The coal plant will be provided with a Bradford breaker and hammer mills, and is designed to handle any coal from run-of-mine to washed slack. Provision has also been made for the addition of blending bunkers at a later date, should blending become desirable. The plant will thus have the maximum flexibility of output, the widest choice of coals, and the greatest measure of control over the type and quality of the coke.

When completed, the proposed new installations of coke oven plants in Sheffield and the intermittent vertical chamber plant at Rotherham will be the main gas-making plants in the division, and, with the gas purchased from coking plants owned by the National Coal Board, the Iron and Steel Corporation, and the independent companies, will carry the main gas supply load.

Purchased Coke Oven Gas

Let there be no doubt that the fortunes of the former Sheffield Gas Company were founded on the large industrial load made possible by the supply of coke oven gas, which, in the '30s, very largely carried the load variations, mainly by bleeding. Because of the need to make the best possible use of coal, it is now essential that gas should in no avoidable circumstances be bled or even burned uneconomically, and the problem of the quantity of coke oven gas to be accepted must therefore receive much more careful consideration than in the past, with particular reference to load variations and storage.

The guiding principles in the Sheffield and Rotherham division are:—

(1) Gas should only be stored near the point of consumption.

(2) Only in exceptional circumstances should coke oven plants remote from the points of usage be called upon to take up load variations.

The first of these does not require any elucidation, but something must be said about the second.

Coke oven gas has been received in Sheffield since the first world war, and in considerable quantities for about 20 years, during which time much experience in handling it has been gained.

During the last few years the consistency of supply has been much better, and quantities do not so often drop suddenly without warning. This is due to the greater measure of co-operation of the plant managers, which is fully appreciated by the staff in Sheffield. There are, however, occasions when coking plant is down for major repairs during the heavy winter months, and greater co-operation at such times would be of material assistance.

It must be realised that any external supply of gas from a coking plant takes only second place in order of precedence; the underfiring gas must come first. On many occasions, too, the external supply has dropped to third place, fuel for boilers coming up to second. If, therefore, there is any delay in the pushing schedule, from whatever cause, the delivery of gas decreases much more rapidly than with normal gasworks plant, and takes a correspondingly longer time to return to normal.

If coking plants remote from the points of usage are equipped with producers to provide an alternative method

(*Continued on p. 689*)

FOR GASMAKING

Some like to carbonise VERTICALLY | others prefer the HORIZONTAL method

Again — some insist that the process shall be a

Continuous one

while others have a preference for an

INTERMITTENT SYSTEM

However, the majority agree on one point and that is that the plant must be built by Woodall-Duckham which is fortunate because

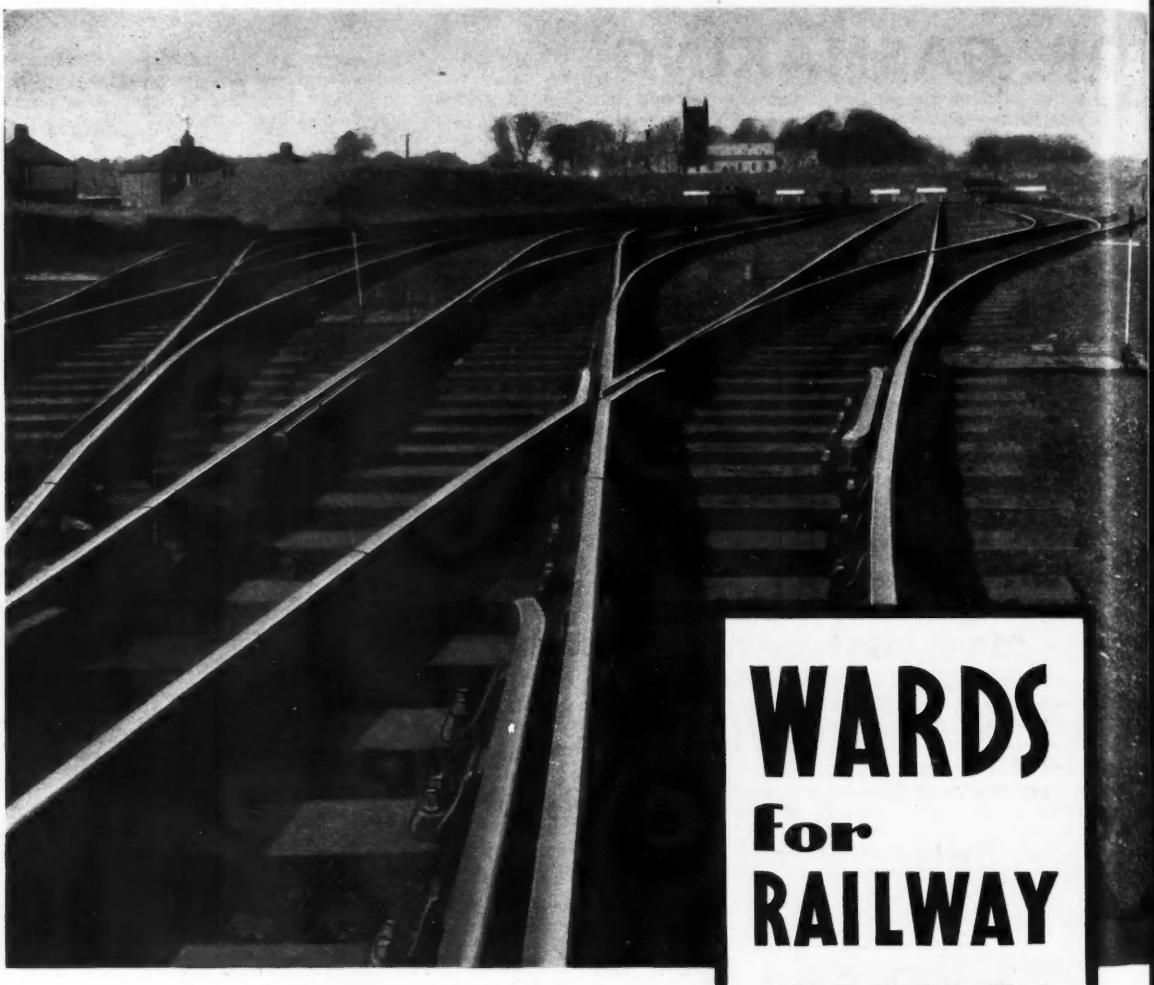
W-D have built thousands of VERTICAL RETORTS both *Continuous* and INTERMITTENT

and batteries and batteries of COKE OVENS which are horizontal

and they know most of the answers

W-D

D



WARDS for RAILWAY SIDINGS

IN the planning and construction of railway sidings, Wards offer a high degree of technical skill and experience. Wards have been building sidings for nearly half a century and thus bring to the subject an extensive knowledge of a variety of operating conditions. Similarly, in the supply of railway equipment generally, Ward's Rail Department service covers new and re-usable rails of all normal sections, as well as switches, crossings, turnouts, buffer stops, etc. Associated supplies include colliery arches, pit props, roofing bars, floor plates, and, of course, all manner of track accessories and tools. In short, Wards provide a comprehensive service on every aspect of railway siding, planning, construction and maintenance.

The layout illustrated above shows a ladder of sidings at the Primrose Hill Unit of the National Coal Board, by whose courtesy the photograph is reproduced.

ANOTHER ASPECT OF TWW SERVICE

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of underfiring and, therefore, flexibility of gas output, the cost of the 'additional' gas so released is related to the cost of the 'coke therm,' which must, under present conditions, be higher than that of the 'coal therm.' To this already high price must be added the cost of the main and of pumping. The capital charges on the main and compressors, designedly only partially loaded, must further enhance the already high cost of this gas. The variations in output should, therefore, clearly be taken up in carbonising plants, at gasworks, equipped with alternative methods of firing and operating at the point of storage and near the point of use.

Of still greater importance is the risk of failure of the long trunk mains conveying the gas. The risk of such failures, particularly in districts liable to subsidence, is very real. So far, the main 24-in. trunk of the northern grid into Sheffield, although considerable leaks have occurred on many occasions, has not been so badly damaged that it has been impossible to patch it until a shut down at a week-end has permitted a complete repair. Leaks reduced to manageable proportions have been watched for days and nights. With the smaller feeder mains, however, the damage has frequently been so bad that the plants have had to be shut down urgently and the mains isolated for immediate and complete repairs. In many cases, the mains failures have been due to corrosion and internal deposits.

It is necessary, if the best use is to be made of plant and storage, to run the stock of gas down in the Sheffield works on Friday afternoons to something like an hour's supply. It would, therefore, be very unwise of the Board to rely for the supply of gas to industries, of the importance of those in Sheffield, on too great a proportion of gas pumped from manufacturing plants remote from storage and use.

Gas Storage

There are a number of stock answers to the question of how much storage is necessary on a gasworks, and in the past the answer generally reflected the courage (perhaps the rashness) or the caution of the individual concerned. With the conditions prevailing in this division, the answer can be given with some exactness, and within limits a 5 mill. cu.ft. capacity gasholder is as good as manufacturing plant of a capacity of 1 mill. cu.ft. a day.

As already stated, gas is stored at the week-end, during the period of low consumption, and this gas is released during 4½ of the five working days. Fig. 1 shows the stocks of gas in Sheffield at 6 a.m. and 6 p.m. each day during a week in February, 1952. The highest stock is just over 30 mill. cu.ft. at 6 a.m. on Monday, and there is a steady fall to about 5 mill. cu.ft. at 6 p.m. on Friday, which represents between 1 and 2 hours output. During the summer, it is customary to work to closer margins, and the target is set between 3 and 4 mill.

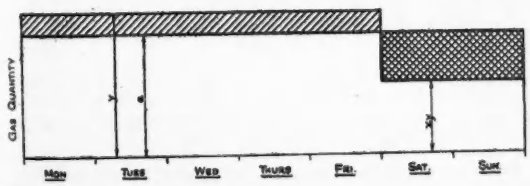

Fig. 2.—Weekly stock loss and gain. All base-load gas. a = daily input; x = week-end load factor; y = average week-day output.

cu.ft. These risks are deliberately run in order to make the best use of base-load gas, and even then it is necessary in summer to shut down most of carbonising plants in the Sheffield gasworks for at least 48 hours, and to ask the coke oven plants to divert a small proportion of their gas to their own use. During the winter, it is nearly always possible to accept all the coke oven gas, but most of the gasworks carbonising plant is shut down for at least 24 hours.

The problem thus stems from the week-end load factor, and the amount of storage required depends on:

(i) the average week-day consumption,
(ii) the week-end load factor,
(iii) the flexibility of the gas-making plant.

If this is set out diagrammatically, as in Fig. 2, in its simplest form without considering (iii) above (*i.e.*, with all base-load plant in operation), the relationship between the stock loss, the week-day output and the week-end load factor, can be assessed thus:

y = the average week-day output.
x = the week-end load factor.
s = the stock loss and gain.
a = the daily gas input.

Then $s = 2a - 2xy$.
The input must, with proper stock control, equal the output over the week, and therefore $7a = 5y + 2xy$.
Then $s = \frac{10y}{7}(1 - x)$.

It must be remembered that this is the stock loss between Monday morning and Saturday morning, and that a margin must be added to allow a safe stock at the lowest point on Friday evening.

The next point to consider is the relationship between the amount of gas to be made in carbonising plant with alternative firing, the amount of base-load coke oven gas to be accepted, the average week-day output, the week-end load factor and the storage, again reckoned as stock loss from Monday morning to Saturday morning.

The symbols are again taken as follows:

y = average week-day output.
x = week-end load factor.
s = stock loss.

For ease of comparison, it is assumed that the output of a carbonising plant under producer gas firing is double that under coal gas firing.

and a = coke oven gas input.
b = gas manufactured in carbonising plant with producer gas firing.

This is shown in Fig. 3.

Thus, the week's input is $5(a + b) + 2(a + b/2)$
and the output is $5y + 2xy$.

These are equal, and

$$5(a + b) + 2(a + b/2) = 5y + 2xy$$

or
$$7a + 6b = y(5 + 2x) \quad . \quad . \quad (a)$$

The stock loss $s = 5y - 5(a + b)$

or
$$a + b = y - s/5 \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (b)$$

From (a) and (b)

$$a = y(2x - 1) + 6/5\ s$$
$$b = 2y(1 - x) - 7/5\ s$$

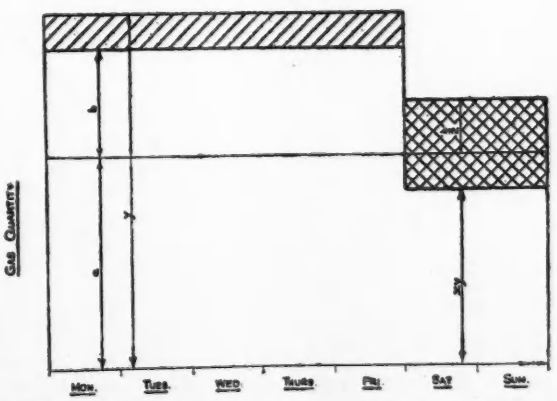

Fig. 3.—Weekly stock loss and gain using carbonising plant with alternative firing, and coke oven gas purchased. a = coke oven gas input; b = gas manufactured in compound carbonising plant; x = week-end load factor; y = average week-day output.

For given load conditions and with a certain storage capacity, these equations show approximately how much base-load coke oven gas can be accepted without reduction in quantity at week-ends and without shutting down base-load gasworks carbonising plant.

As y (the average week-day output) has a direct bearing on a and b, it is clearly necessary to take the summer low load conditions to arrive at the approximations required.

It may be noted here that the cost of building holders solely as a means of accepting more base-load coke oven gas is unreasonably expensive. A very large holder will cost about £55,000 per mill. cu.ft., and, if annual charges for depreciation, interest, and maintenance are taken at 7%, the cost of dealing with each 1 mill. cu.ft. a week for 52 weeks in a year will be £3,850, or 1s. 6d. per 1,000 cu.ft. for the quantity stored weekly.

A proposal to embark on a large programme of holder construction for this purpose would have to be approached with great caution. In perhaps 10 or 20 years, a period much less than half the life of a holder, the Board might well find itself saddled with the heavy capital charges involved, by which time there is the possibility that research now in progress will have yielded a method of making gas in plant as flexible as carburetted water gas plant, but using materials at a much lower cost.

In order to examine how this theoretical approach might be applied in practice, certain assumptions can be made in connection with the divisional load curve for 1951, and from this the amount of carbonising plant with alternative firing required and the amount of coke oven gas to be accepted can be assessed.

The assumptions are as follows:—

(1) All the works in the division are interconnected.

(2) The existing holder capacity is taken.

(3) Coke oven gas is received as base-load gas.

(4) All carbonising plants in the division have alternative coal gas and producer gas firing, and the quantities of gas available are respectively in the ratio 1:2.

(5) Carburetted water gas is available.

From the load curve, the maximum week shows a consumption of 588 mill. cu.ft.; and a normal minimum could be taken as 452 mill. cu.ft.

The worst week-end load conditions occur in the summer.

There are at present 82 holders in the division, with an aggregate capacity of nearly 51 mill. cu.ft. Most of these are small, and at many works they cannot be used fully, as district pressures suffer if they are allowed to uncup.

At the works that matter, the storage, the whole capacity of which is available, is as follows:—

		Approximately (mill. cu.ft.)
Sheffield	Neepsend	15.5
	Grimesthorpe	3.6
	Effingham Street	3.3
	Meadow Hall	8.0
	Barnsley	0.5
Rotherham (Car House)		5.0
Doncaster		2.9
		38.8

For a minimum stock on Friday evening, and a bare working margin, about 80% of these figures can be taken as 'stock loss.' A further 1 mill. cu.ft. could be added for the small holders over which there is a measure of control. The 'stock loss' is therefore assumed to be 32 mill. cu.ft.

The week-end load factor has been worked out for the division during the last three weeks in June and the first week in July thus: 0.557, 0.553, 0.543 and 0.545, with an average of 0.55.

During the period, Sheffield, Rotherham, and the interconnected works show about 0.54, Doncaster 0.7, Worksop 0.8, and Retford over 0.9.

The formula may therefore be applied with the following values:—

y = 74.1 mill. cu.ft. (derived from the the normal minimum week's total 452 and the week-end load factor x).
x = 0.55.
s = 32.

Thus, the amout of coke oven gas that can be accepted is

$$a = y(2x - 1) + \frac{6}{5}s$$
$$= 45.8 \text{ mill. cu.ft. a day.}$$

This takes into account the week-end conditions in the minimum week, and the week-day and the week-end day can be set out thus:—

	Week-day (mill. cu.ft.)	Week-end day (mill. cu.ft.)
Coke oven gas purchased	45.8	45.8
Gas made (coal gas firing)	11.0	11.0
Gas made (producer gas firing)	10.9	—
Stock loss or gain	6.4	16.0
	74.1	40.8

From this it will be seen that the minimum base-load gas must not exceed the coke oven gas purchased plus the gas from carbonising plant operating on coal gas firing (45.8 + 11.0 = 56.8 mill. cu.ft. a day).

The maximum week, with an output of 588 mill. cu.ft., must now be considered. Allowance may here be made for some carburetted water gas, as the Board has inherited suitable plants. If this were not the case, it would probably not be included. A figure of 12 mill. cu.ft. a day is arbitrarily taken.

On the same lines the week may be made up thus:

	Week-day (mill. cu.ft.)	Week-end day (mill. cu.ft.)
Coke oven gas purchased	45.8	45.8
Coal gas (coal gas firing)	16.1	16.1
Coal gas (producer gas firing)	16.1	7.1
Carburetted water gas	12.0	—
Stock loss or gain	6.4	16.0
	96.4	53.0

It will be seen from this that the base-load gas in this case amounts to 45.8 + 16.1, or 61.9 mill. cu.ft. a day, which is more than the minimum base-load gas (56.8 mill. cu.ft. a day) permissible under summer conditions.

Some of the coke oven gas purchased must therefore be replaced by gas from gasworks carbonising plant to obtain the summer—winter flexibility, and the table for the maximum week should therefore read:

	Week-day (mill. cu.ft.)	Week-end day (mill. cu.ft.)
Coke oven gas purchased	35.6	35.6
Coal gas (coal gas firing)	21.2	21.2
Coal gas (producer gas firing)	21.2	12.2
Carburetted water gas	12.0	—
Stock loss or gain	6.4	16.0
	96.4	53.0

(*Concluded on p. 697*)

BM21

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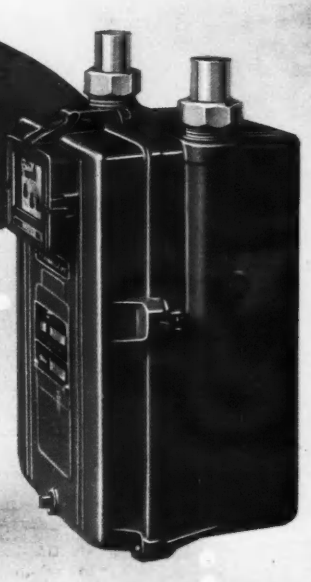

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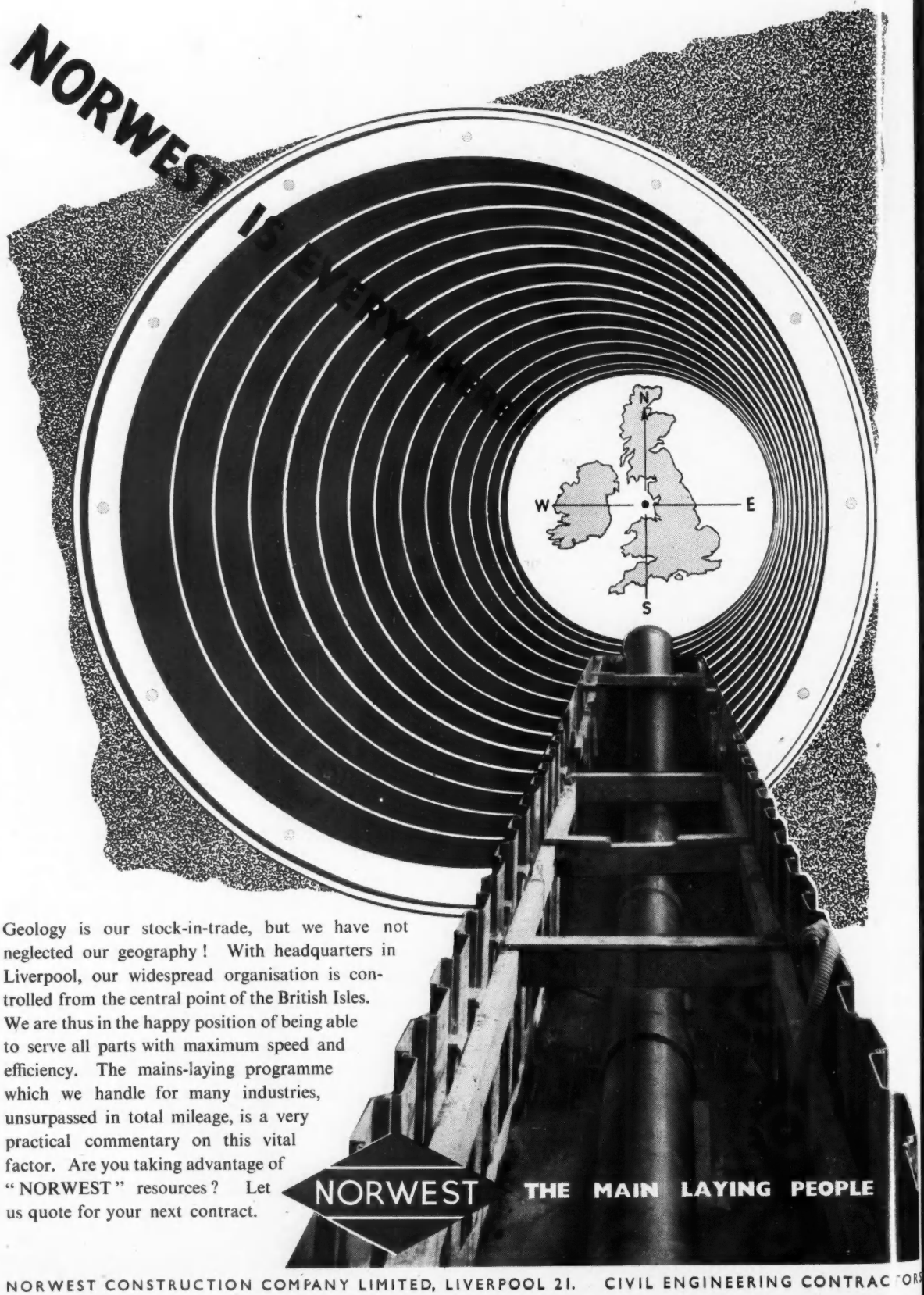

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CVS-12

Waste Heat Recovery by Gas Turbine

The following is our report of the discussion on the paper 'Application of the Gas Turbine for Recovery of Waste Heat' given by Captain (E.) W. GREGSON, R.N.R., at the research meeting of the Institution of Gas Engineers on November 25, 1952.

MR. G. LE B. DIAMOND, C.B.E. (Chairman, West Midlands Board), said it was Captain Gregson who conceived the idea of co-operating with West's Gas Improvement Company in introducing the first gas turbine installation to a British gasworks. It so happened that West's had a contract on paper with the Coventry Corporation for the installation of a new carbonising plant, and on the advice of their then Engineer and Manager, Mr. Wakeford, the city authorities decided to allow an installation to be placed at Foleshill.

On vesting day the West Midlands Gas Board inherited this contract, and after an examination of all the factors, it was decided that it would be in the national interest for it to proceed. The turbine and the carbonising plant with which it was associated should have been working by 1951, but circumstances intervened, and it became necessary to defer the erection of the plant in favour of another contract which could be brought into production earlier. The general difficulties and frustrations of the times, which were so familiar and exasperating to all engineers, had also played their part. However, the new carbonising plant was now taking shape and bricklaying would commence during this winter, so that it was anticipated that the turbine would be in operation early in 1954.

In comparing the three types of gas turbine cycle, it was suggested—and he agreed with the suggestion—that the inverted cycle was unlikely to be attractive to the gas industry. The author stated that the design of the compressors used on the small sizes in the closed cycle were difficult, and this presumably meant that the efficiency might not be as high as with larger units, for there was relatively a small mass flow. Would it be fair to draw the conclusion that the open cycle had the advantage on the small installation, but that this advantage disappeared as the size of installation increased?

Fair Comparisons

The author had given fair comparisons between modern steam units and the gas turbine, and had shown that the improvement in power output was at least 26½%. He quoted A. W. Pope's paper to the London and Southern Section of the Institution whereby a higher power output could be obtained using a lower cycle reject temperature and the utilisation of the high pressure steam generated in a mixed pressure pass-out turbine. The power output might be up to 40% above the all-steam scheme.

The gas industry, continued Mr. Diamond, has been backward in its application of the best modern standards through the design of steam and power services on gasworks, and they all knew the reason, which, in the main, had been due to the availability of large quantities of low-grade breeze. On most of the new works now being built much thought had been given to the design of the steam power plant, and in the West Midlands alone they had one large installation which would be put to work next year where the steam would be produced in waste heat boilers at a pressure of 350 lb. per sq. in. to be expanded to 25 lb. per sq. in. in turbo-alternators.

The electrical power thus produced would normally be sufficient for all prime movers except boosters and only a standby feed water pump would be steam driven. The process steam requirements of the works would be met in full and a substantial contribution of low pressure steam would be available for the needs of an adjacent works. It would be a most interesting exercise to compare the economics, including the capital charges, for this steam scheme with the economics of heat recovery by means of a gas turbine.

Regarding the main air preheater, which was both ingenious and novel for the manner in which the author had tried to escape the great expense of constructing the whole of the exchanger from the appropriate alloy tubing. He questioned, however, whether the plain carbon steel sections would not have been better if they had been given a vitreous enamel coating of refractory material in a manner similar to the protective coating put on the exhaust manifolds of aircraft engines.

It was not quite clear to him why a relationship was established between heat transferred and tube weight of the air preheaters, since the preheater was not a thermal storage unit. He would have preferred to see the heat transfer load (K) expressed in B.Th.U. per sq. ft. per hour per °F. There must be some loss of the re-cycled air and the author did not explain how this was made up. For example, soon after the turbine had commenced to run, the oxygen would combine with the iron in the tubes of the preheater, which would result in some volumetric loss. He (the speaker) would also like to know how governing was affected, for the re-cycled air did not appear to be so easily managed as steam and some provision must be made to prevent a runaway in the event of a sudden removal of the load.

Part Load Surge

The compressor was only partly axial flow and partly radial and, while he could see the reason which militated against an entire axial flow machine, he was not at all sure that it would not have been an advantage in this case to have selected the centrifugal type. The axial flow compressor was liable to part load surge and could sustain damage. The author had not said anything about the surge line characteristics. Recently they had been examining the merits of this type of compressor for the distribution of gas at medium pressures and had had to take precautions to install a protective device to avoid part load surge on a compressor they were installing. He would like to know what steps had been taken to meet this contingency in the Coventry machine.

The author described the system of intercooling between the low pressure and high pressure compressors but did not state whether some degree of control would be required for inter-stage matching.

The great advantage of the axial flow compressor was its comparatively low capital cost for its output and its high efficiency compared with the normal type of machine. Unfortunately, they had been very slow in the gas industry in adapting the immense developments in compression engineering which had derived from gas turbine research.

Mr. J. B. Bucher (John Brown and Co., Ltd.), commented that the author had referred to three types of gas turbine—the open cycle, the inverted cycle, and the closed cycle. He wondered how an open cycle or an inverted cycle would behave in the atmosphere of a gasworks. Some years ago they ran an open cycle gas turbine at Clydebank. It was in one of the fitting shops, where they carried out a certain amount of filing and buffing; nevertheless they regarded the air as being a good deal cleaner than that of many gasworks he had visited. After as little as 100 hours running, they found, on the open cycle gas turbine, that they had lost about 25% of the power. Investigation proved that this loss was due almost entirely to dirt on the compressor blades. Admittedly some compressor blade designs were less liable to dirt than others, but all suffered to some extent. They finally fitted filters on the plant, but in order to get satisfactory air

cleaning without excessive pressure losses, they had to have 1 sq. ft. of filter area for each 2 H.P. net output. Even then, the question of filter cleaning and maintenance became a major problem. Personally, he found it difficult to envisage how the open or inverted cycles would overcome the dirt problem. The closed cycle, of course, was not worried by dirt in the atmosphere because it cycled the same air round and round. The leakage from the circuit through the glands was made up by a small auxiliary pressure, but with a plant the size of Coventry the leakage would be a matter of only a few cubic feet a minute and that quantity of air could easily be filtered.

Captain Gregson rightly mentioned that if the component efficiencies were the same, the net power obtained from any of the three cycles would be the same. This also applied to the steam or hot water generation through the turbine exhaust. On a closed cycle, a boiler, after the heat exchanger, could generate the same amount of steam as on an open cycle. In the case of the closed cycle, the heating medium was under pressure and consequently heat transfer rates were higher.

In the Coventry plant, as the author had said, the pre-cooler was a water heater. About 45% of the waste heat—the heat extracted from the waste gases of the carbonising plant—was put through this pre-cooler into the well water. That 45%, plus the 25% power at the terminals, gave an overall heat utilisation of 70%. The control system on the Coventry plant had been designed with a view to the fact that the primary job in the life of gas engineers was to produce gas and not to fiddle with gas turbines and other auxiliary plant. It was hoped that the system would be completely self-supporting. The output of the turbine normally would be such as could be provided from the amount of waste gases put into it, but there was provision should the set at any time go off the grid. He would say the amount of power generated by the gas turbine was in excess of the works requirements and normally there was a surplus for the grid. In the event of the pump coming off the grid, the turbine would have to supply only the works and then at a reduced output. This reduction to reduced output was automatic, and it would become simply a self-governing set running independently of the grid. If anything happened to the alternator, the normal overspeed trips came into operation and alarms sounded. When one of the plant engineers had time to go along and find out what was wrong, he would do so, but the plant would not be damaged if he did not go immediately.

Use of Low Grade Heat

Mr. A. W. Pope (W. H. Allen and Co.) said that the Coventry installation was a particular scheme in being able to use the low grade heat rejected by the pre-cooler for heating all the station water. In some other stations they had looked into, if a gas turbine was fitted to increase the electrical output, it was not too easy to raise the required quantity of steam. For that reason, his firm had concentrated on a different cycle in which they used a waste heat boiler and an economiser to recover heat from the heat exchanger outlet in the form of steam.

Let them consider the heat balances of the two schemes, assuming that in both cases the air heater imported 100 units of heat to the turbine cycle. In the Coventry scheme, using the author's figures, 30 units appeared as power or radiation, 28.5 units appeared in the intercooler and 40 units were rejected in the hot air from the heat exchanger. Further, as an intercooler was used in the Coventry scheme, this air was rejected at about 160°C.—not actually given—compared with 240°C. in the Allen scheme. In the Allen scheme approximately 30 units again appeared as power or radiation, and 70 units were rejected from the heat exchanger.

Thus, in the Coventry scheme the air flow in the turbine was twice cooled through the range 100°C. to 20°C., once in the intercooler and once in the pre-cooler. In other words, 57% of the heat import to the turbine was rejected below 100°C., while in the Allen scheme the corresponding figure for heat rejected over this range was 35%. The Allen scheme had therefore, if required, more higher grade heat available, suitable, for example, for raising low pressure steam.

In the past, except for particular uses, such as in H.M. warships, the gas turbine had really only been justified in composite schemes, when the very large amount of waste heat in its exhaust had been harnessed usefully. By these means, in spite of the low efficiency of the gas turbine itself, high overall efficiencies had been possible of 50 to 65%. This state of affairs would not continue in the future. Since the gas turbines which were now running—in 1945-48—were designed, there had been significant increases in component efficiencies, both compressor and turbine, and a marked rise in permissible maximum cycle temperature for long life engines. Advances from 650°C. to 750°C. were possible by the introduction of Nimonic 90 instead of Nimonic 80 as blade material. It means that whereas with Nimonic 90 at 700°C. blade temperature they could run at 7 tons per sq. in., at Nimonic 90 that figure became 16 tons per sq. in. That was the measure of the metallurgical advance in the last few years.

Taking these revised efficiencies and increased allowable temperatures, with turbines which were being designed today—not those running today—a simple base load gas turbine with heat exchanger would have a thermal efficiency of 30 to 31.5% in the power range 1,500 to 4,000 H.P. compared with 22 to 24% for engines now running. When they remembered the negligible consumption of lubricating oil, these figures suggested that the gas turbine would shortly be directly competitive with the diesel engine.

Story Not Finished

The story was not finished yet, of course, and they would be aware that Nimonic 95 had been announced recently, and was worth another 2 tons per sq. in. stress at a given temperature. Turbine discs did not now present any problems, as they could be kept 300° to 400° cooler than the gas stream by a very modest amount of air cooling. Turbine casings were usually of a double skin construction. The inner skin was segmented, of heat resisting steel and located in the outer casing, which remained cool and therefore free from distortion. The question of air filtration was certainly a problem, and he suggested that it warranted the use of an electrostatic precipitation type of filter.

If a more complicated cycle was considered—a compound engine with two compressors and intercooler between them and the heat exchanger—a further increase in efficiency was obtained, and the figures showed a thermal efficiency of 36%.

With reference to waste heat recovery from gasworks retorts, the air heater required expensive materials and, therefore, in order to keep its size reasonable, it was probable that a higher thermal ratio than 70% would not be economically acceptable. With a waste gas inlet temperature of 850°C. and an outlet temperature—to waste heat boiler—of 400°C., a gas turbine with heat exchanger could not have a maximum cycle temperature of more than 650° to 675°C. This was considerably less than gas turbines could accept nowadays. The shaft efficiency would be approximately 26 to 27% instead of a possible 30%. Thus, to make efficient use of a modern engine ways must be found of increasing this maximum cycle temperature, which at the same time would enable more low pressure steam to be raised from the air out of the heat exchanger. Further, to justify the introduction of the gas turbine on all large stations, it was really necessary that it should offer more than a modest 20 to 25% increase in power output.

This again could only be done by raising the cycle inlet temperature, which meant a waste gas temperature in excess of 850°C. being available. As the gases left the top of the retort at around 1,050°C., it would seem that thought should be given in the industry to ways and means of reducing this loss of 200°C.—1,050°C. down to 850°C.—for waste gas available at, say, 950°C. would represent a big step forward and revolutionise the art of waste heat recovery.

Mr. James Hodge (Power Jets, Ltd.) remarked that his company had taken an interest in the inverted cycle, and they had done this not primarily for application to gasworks waste heat recovery but to point out that there was another cycle available for all kinds of waste heat recovery. The difficulties pointed out were real in that the dirt, condensation, and so on were serious, particularly with gasworks use, where there were impurities in the gas.

On the other hand, it should be pointed out that the inverted cycle gave an opportunity of using the maximum available temperature of the waste gases, which could not be done on the other two cycles. The maximum available waste gas temperature was 850°C. That meant that with the closed or open cycle they got a maximum gas turbine cycle temperature of about 650°C. With the inverted cycle they could use 850°C. direct into the turbine. That was a way of using the

(Continued on p. 697)

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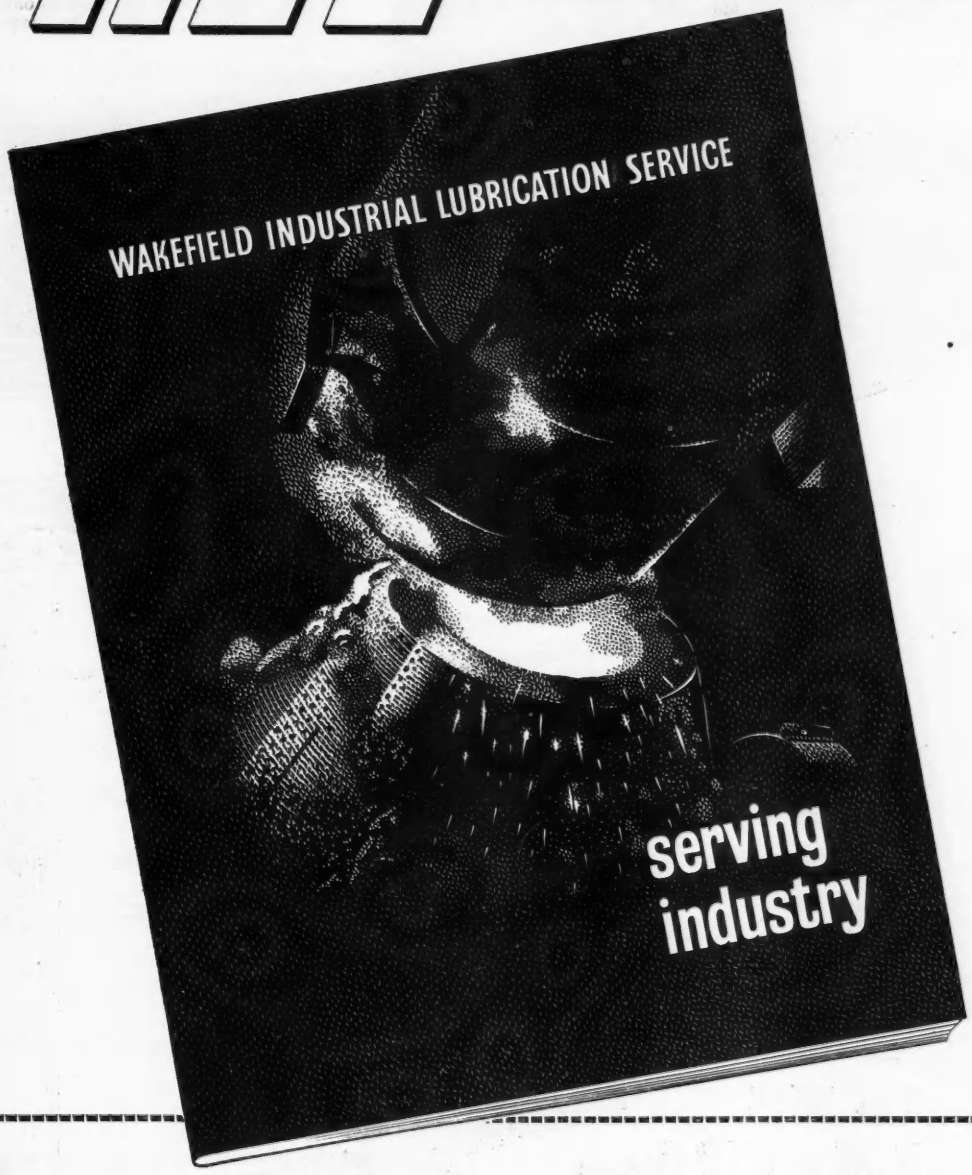

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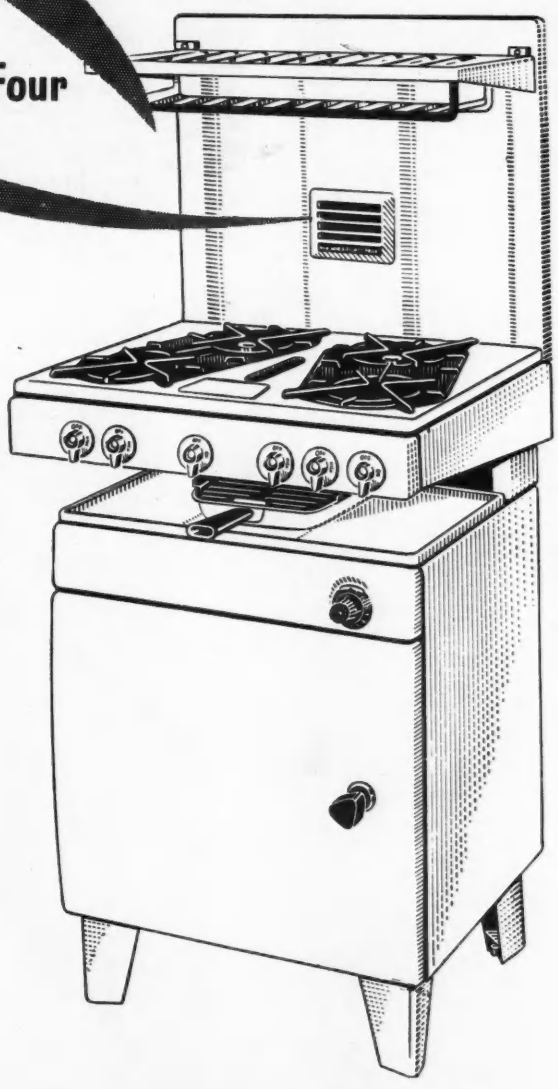

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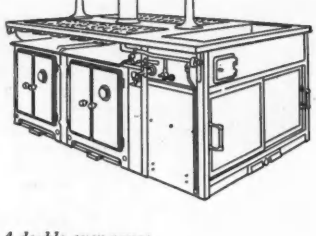
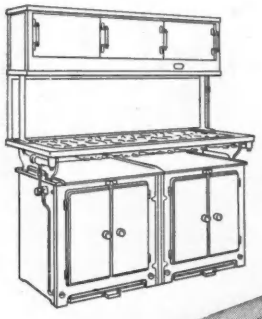


A central range incorporating a Bain-Marie and hot-closet.



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whole of the available maximum temperature, so that the output they got from such a cycle was considerably greater. With some applications—not necessarily with waste heat recovery from gasworks—that might prove advantageous in the future and was worth bearing in mind.

Mr. **M. Redman** (North Western Gas Board) suggested that the future would see the waste heat gas turbine widely extended in industry. At the same time, there were several other factors which, when taken into consideration, rendered the proposition less attractive than first thought would indicate. It was unwise to compare the maintenance of industrial turbines with the aircraft engine, where the life of the engine was very short and where engines were replaced. They were not expected to give a life of 100,000 hours, as in the case of an industrial turbine.

The air preheater gave him some cause for concern. While they might design the preheater for gas temperatures which were quite reasonable, certain things could occur in practice. A severe retort leakage, when the setting was nearing the end of its life, might cause considerable damage. Another point was the possibility of variation in the process steam demand, and if the cycle had been designed for a specific production of process steam, this might be considerably upset by the increased requirements which could occur in practice.

Another interesting point concerned part load performance. He would be glad if Captain Gregson could give an idea of the power output of 40 to 50% of the heat input, which would be of a lower temperature than the normal 850°C., and how the operation could be modified if the process steam requirements did not fall in the same ratio.

He was not convinced by the author's conclusions that the cost of the steam scheme and the gas turbine scheme would be similar, since the cost of the gas turbine was greater than that of the steam turbine for a given scheme, and the consideration of a standby plant did not alter that conclusion.

In considering the merits of the open and closed cycle, he had calculated the power production of the Coventry scheme, and while there was an increase in power on the gas turbine cycle compared with the steam scheme under conditions of 235 lb. per sq. in. and 700°F. total temperature, the difference in output was so small as to suggest that to the gas industry the closed cycle was perhaps not so attractive as the open.

If they considered the open cycle gas turbine *cum* steam turbine scheme, the capital charges on the extra power over and above that produced by a pure steam turbine scheme were, as far as he could make an assessment from prices at his disposal, between 0.4d. and 0.5d. per kWh. Since the British Electricity Authority was only likely to offer a price for current sold to the grid at its own generating charge which was similar to this figure, the installation of a gas turbine to produce extra power was only justifiable if they could use that power themselves the whole of the time and not just at peak periods. Considerable savings would accrue in these circumstances compared with electricity purchased at 1d. per kWh. Such cases were likely to be rare, since a continuous vertical works could usually produce all its electricity requirements from a steam turbine using only waste heat steam, unless it had a very high gas compression load. There were some other cases where a gas turbine might be justified, for example where there was no existing waste heat steam turbine scheme and where a new economic unit was being built or where several steam pressures were undesirable.

In considering the application of the gas turbine it was also necessary to pay careful regard to the question of standby charges for grid current since these would be increased if there was no standby for the whole of the home-produced power. It seemed to him clear that with the improvement of materials and component efficiencies, the gas turbine would undoubtedly come to be regarded in the future as a normal method of waste heat recovery on continuous vertical retorts, and they were indebted to the West Midlands Gas Board for its enterprising pioneer work in this field.

PLANT SELECTION AND COKE OVEN GAS—

(*Concluded from p. 690*)

With the assumptions made it is thus shown that 35.6 mill. cu.ft. of coke oven gas can be purchased daily in the division throughout the year except for holiday periods. This quantity could be increased if, within limits, the storage capacity were increased, or if there were an improvement in either the annual or week-end load factor, or both. If, on the other hand, the quantity of carburetted water gas were reduced, the amount of gas made in works carbonising plant with alternative firing would have to be increased at the expense of coke oven gas purchased, in order to maintain the necessary flexibility.

Conclusions

It will be seen that the problem confronting the division is both unusual and complex, and it must be emphasised that the conclusions drawn are unlikely to apply in any other part of the country.

They may be summarised as follows:

(1) The right type of plant to install in the gasworks is the coke oven plant with alternative coal gas and and producer gas firing, or, if either the capacity or the site precludes this, the intermittent vertical chamber plant similarly equipped.

(2) Gas should be purchased from coking plants underfired by coal gas only, and the quantity that can be accepted economically must be carefully assessed both in relation to the load curve and to the storage capacity.

(3) Carburetted water gas must be kept for extreme peak loads and for emergency use only.

(4) Above all, it must not be forgotten that by far the largest proportion of gas is sold in a highly competitive market, and that the largest proportion of gas must therefore be made available at the lowest possible price.

METHODS OF TESTING REFRACTORY MATERIALS

A STANDARD which has just been issued by the British Standards Institution describes methods of test having a general field of application and is based on the work of the Testing Committee of the British Ceramic Research Association. It relates more particularly to fireclay and silica refractories.

The following standard tests are described: Chemical analysis, including the determination of hygroscopic water, loss on ignition, determination of silica, ferric oxide, titania, lime and magnesia, and determination of alkalis; physical tests, including the determination of porosity and density, true specific gravity, permeability to air, refractoriness, refractoriness-under-load, permanent linear change on reheating, cold crushing strength, reversible thermal expansion, and resistance to the disintegrating effect of carbon monoxide. A tentative test for resistance to thermal shock is given as an appendix.

PROTECTIVE SPECTACLES

A NEW British Standard for 'Green Protective Spectacles and Screens for Steelworks Operatives' (B.S. 1729:1952) specifies spectacles and screens with a view to providing comfortable vision and protection against possible injury to the eyes from harmful radiation. The standard provides also for the colour matching of pairs of lenses so that broken glasses can be replaced without affecting the wearer's ability to judge furnace conditions.

Eye-protection filters, either as lenses or as shields, are necessary for viewing industrial operations in which radiation of high intensity is emitted; for example, welding, the collection of molten glass, and steel making and working. This radiation is commonly divided into four categories: infra-red, light, ultra-violet and total heat.

Advantages of the green glass are that they protect wearers against harmful infra-red radiation while the blue filters do not; they are more comfortable in use because of the lack of chromatic aberration.

Copies of both the above standards may be obtained from the British Standards Institution, Sales Branch, 24, Victoria Street, London, S.W.1. Price 2s. 6d.

MAINLAYING UNDER CONTRACT

By R. DUTNALL,

Chief Estimator, Wm. Press & Son, Ltd.

From a paper to the Scottish Junior Gas Association (Western District).

TO those who ask why it is necessary to employ contractors and what advantages there are in doing so, I think the basic answer is the same now as it was in the days of Telford and Rennie—you just cannot do everything yourself.

Before a gas undertaking can embark on a programme of direct labour works, at costs equal to the prices quoted by contractors, it must be assured of enough work to occupy it continuously for a reasonable period, without the likelihood of economy cuts and restrictions during that time. It must have available sufficient staff both to design and supervise the works, enough suitable labour, and the certain availability of whatever plant is necessary for its proper execution. Today no nationalised industry can be completely sure that its capital expenditure programme will not be modified at quite short notice, and, again, one must assume that its permanent staff are fully occupied with their routine commitments so that such an addition in their activities must entail an increase in personnel and equipment to cope with it.

A good deal of the work will require specialised knowledge and expensive plant, and without a reasonable period of work ahead the task of recruiting satisfactory technical staff and experienced labour is made most difficult. The purchase of the plant becomes a risky economic proposition and it is doubtful if temporary staff and hired plant will achieve either the highest standard of work or the maximum economy.

Framework of the Business

The framework of a contractor's business is based on his head office and site resources, and the manner in which he divides the duties involved decides the form of his organisation. There are obviously general requirements which apply to the whole of his business and particular duties which arise for each individual contract. Generally speaking, most contractors deal with questions of finance, accounts, and insurance. Stores of tools and equipment are also usually maintained by them. Estimating is generally centralised and, with it, some form of costing and the clerical duties involved in recording the use and availability of al lhis equipment.

The introduction, in recent years, of mechanical plant suitable for use on mainlaying has been one of the few outstanding changes that has taken place in this class of work. It has helped considerably in the problem of labour shortages and has speeded up the work to a great extent. The design of this sort of plant is highly specialised and essentially a task for those having a complete understanding of the requirements of the user. Its employment on site has brought with it new methods, and entails a different approach to some of the problems. The capital outlay is, of course, heavy, and before deciding if plant will be an advantage it is necessary to strike a balance between the cost and the economies in time and labour that will result from its use.

Although it may sometimes appear that the purchase of a particular item of equipment would greatly simplify the carrying out of the job in mind, the ultimate decision on a question such as this is whether the job will pay for the equipment; if not, it must be reasonably certain that sufficient similar work will follow over which the balance of the cost can be spread; otherwise a special purchase may not necessarily achieve a saving in the long run.

As soon as an item of plant is purchased you are faced with the necessity of ensuring its proper care and maintenance. When one remembers that it must be kept working in all weathers, subjected to all manner of circumstances and conditions, thorough servicing and regular overhauls become an essential task needing the contractor's closest supervision. Breakdowns on plant not only involve the cost of the repairs, but cause delays right through the work which involve time and money that can seldom be recovered.

The usual practice with all plant used on public works is that it is brought into the contractor's depôt for a complete overhaul after a specified number of working hours, according to the type of engine and the nature of its work. Daily routine maintenance is done by the operator on site, and regular checking and inspection by travelling fitters is also carried out. Minor repairs and replacements are done, whenever possible, on site also.

Turning to the practical side of mainlaying, I should like to emphasise that the contractor responsible gets plenty of kicks but not, necessarily, plenty of halfpence. Trenches, either in highways or private land, are always bound to upset somebody and the contractor or his agent, or foreman, is the poor unfortunate who is on the site all the time! The major item is usually, of course, the excavation—be it a machine job or hand excavation—and here I must remind you that before you can consider using a machine you must have several weeks' continuous work in front of you. With haulage costs what they are today you just cannot put an excavator on a job that will last only two or three weeks, expect it to pay for the cost of moving the machine to site, and still leave a profit.

The Ideal Job

Probably the ideal job for machine excavation is the wide verge on a trunk road, clear of towns and villages, and free from as many of the other utility services as possible—but how often do you find a gas main laid in these locations? Cross-country high pressure mains also lend themselves to the highest degree of mechanisation, but the remainder of the more urban gas main routes are still best tackled by hand gangs, or possibly hand and machine together. In built-up areas you dare not open unlimited lengths of trench; traffic requirements would probably prevent it anyway, besides which restricted working room, other services, and in particular cross-road connections, usually all combine to rule out machine work.

It must not be overlooked that, on mainlaying, it is most unusual for the machine output to determine the rate of laying. Therefore, a fair proportion of standing time must always be expected, but as soon as it becomes necessary to hold the machine back below this average output then costs begin to rise very steeply.

The best solution when machines cannot be used is to provide some form of incentive to hand gangs to obtain a reasonable progress rate. The payment of a bonus, based on the output achieved, is the best method of dealing with this. Excavation is one of the easier operations to bonus, and results, even on quite difficult jobs, can be astonishing.

Sometimes, on extensions or alterations in the bigger gasworks one does encounter the more difficult excavation jobs. Two or three mains, perhaps 24's and 36's in the same trench.

well down, bring the inevitable pumping problems, but also the only too infrequent chance to see an example of good sound heavy trench timbering, which I personally feel is such a satisfying sight.

The contractor's problems in excavation can be greatly varied. He is always faced with the inevitable uncertainty which must arise when you propose to dig a hole anywhere; nobody can tell exactly what will be encountered. The various types of subsoil behave quite differently, water crops up in all sorts of circumstances, and rock, when it is met with, can vary a good deal in its degree of hardness.

Running sand is anybody's guess, for in those areas of the country where such light waterlogged subsoil is encountered a specially difficult problem is always experienced in dewatering the ground without also removing the fine solids. In these circumstances the modern well-pointing equipment is proving of great value, for, by surrounding the excavation with pumping points, carried down below the level of the digging, the trench, sometimes in even the worst of wet sand, can be maintained in a dry and stable condition.

Under modern traffic conditions it is an impossibility to replace the previously broken up surfacing material in such a way that it will remain there for any length of time once the traffic is allowed on it again. However, that does not seem to prevent some authorities and boards insisting that the contractor tries to do it, often for as long as 12 months after completion of the works. The only practical and sensible solution to this is the provision of a thin coating of new tarmacadam.

Principal Items of Plant

The principal items of plant employed for trench digging are compressors and excavators. Besides breaking up road surfaces and also testing, compressors can be used to operate rock drills, to drive pipe cutting machines, and for the mechanical caulking of lead joints. Mechanical excavators are of two distinct types, the rotating bucket trencher and the older form of multi-purpose digger, the latter consisting of a crawler-mounted base machine to which can be fixed a choice of several different fronts and equipments. There is often a good deal of debate as to which is the better type for trench excavation. On a straightforward job the rotating bucket machine is probably faster but it does not like the heavier materials. The ordinary digger fitted with a back-acting equipment can cope with them all, except rock, and can also be used for back-filling and drawing trench timbers. Bulldozers and angledozers are used nowadays too for this task, more frequently on cross country work, and mechanical loading shovels can be used to advantage for this and for loading up the surplus excavated materials.

Pipelaying retains one element which so far remains a purely hand task and that is, of course, the proper bedding of the pipe. I feel that the importance of this job, particularly on small mains, is frequently overlooked. From the contractor's point of view the pipelayer can control the speed of laying, and if he does his job correctly he can be the means of preventing subsequent trouble for the undertaking.

I have tried so far to outline the contractor's side of the picture, but the success of any project does not depend entirely on him. Employing authorities, such as the gas boards and their undertakings, have their contribution to make.

The first positive step which is taken after deciding to put out a job to tender, must be the preparation of the necessary contract documents, and they should have careful thought; the conditions to be applied and the obligations and performance required must be set out very clearly.

The route having been surveyed, the drawings will be the first important document. The standard required will obviously vary in accordance with the type and magnitude of the work. For mainlaying they need not go beyond a route plan showing the points between which the main will be laid. This can probably be kept to a scale of 1/2500 and separate larger scale detail drawings provided for special jobs such as river crossings, connections, valve pits, and so on. The drawings should always be prepared by the undertaking. It is not good practice to leave them to the contractor unless it happens to be for a very specialised type of construction. A complete set of contract drawings should be supplied to each firm tendering for the work. The practice of making only one set available for inspection at the engineer's office does not give tenderers sufficient opportunity to study all aspects of the work.

The form in which an actual tender is set out can have several variations. The main difference being whether it is of the lump sum type or on a cost reimbursement basis. The latter, which is not in general use, is usually based on the actual net cost of the works to which is added a percentage, a fixed fee sum or a sliding scale of fees. The most commonly employed form of lump sum tender is based on a bill of quantities, although the gas industry appears to favour a schedule of prices.

The objects of a bill are to provide the engineer with an accurate idea of his ultimate expenditure and the contractor with a clear and complete document which will enable him to compile his figure. It is made up of a detailed list of the quantities of work involved, against each of which the contractor quotes a net price. These are multiplied by their respective measurements, giving a series of sums. The sums are then added together to arrive at the total tender figure. To my mind its advantages are that it is a fairly simple matter to compare the various tenders received and, also, only the measured quantity of work actually done is paid for. Its only disadvantage appears to be the extra time and care needed to compile it.

The accuracy of the quantities is very important from the contractor's point of view because his overall costs and profit are usually spread over all the rates, so that a big downward variation in quantity could entail serious loss on a job.

'Fixed Lump Sum'

The 'fixed lump sum' form of tender is, I feel, used on some occasions for which it is not really suitable. Its use should be confined to the smaller jobs in which all the work is either above ground or at least fully and completely visible —in other words, where unforeseen factors likely to affect the quantity or price will not arise. If these conditions are not satisfied it becomes in a sense a quantity estimate, as well as a price estimate, and the contractor is being expected to duplicate his risks, with the result that the successful tender is only too often the one in which some quantity of work has been either under-measured or omitted completely.

The schedule of prices, in use generally throughout the gas industry, is quite adequate for mainlaying work provided the contractor is given enough information to assess the total quantity involved. It is my opinion that it must be difficult to compare tenders received without these quantities, but it has been noted recently that schedules giving the lengths of mains under various surfaces are becoming more widely used and presumably this is simplifying the task of selecting the lowest tender.

As you are no doubt aware, the terms of contract usually provide for payment of work by monthly instalments, representing about 4/5ths of the value of work done. Now there is bound to be a lag of at least one month under this arrangement before any cash is received by the contractor, but when, as is very frequently the case these days, this time lag widens to two, three, or four months, the contractor has to use extra capital to enable the contract to proceed.

This is uneconomic for him, as his profit is related to the total capital employed, and, as his costs in financing contracts must be included in his prices, the tendency is to increase these accordingly. The undertakings suffer because, as they would probably be able to borrow at a lower rate of interest than the contractor, they are paying more than they need do for the use of the money. Furthermore, if the contractor can get his money back quickly, he can increase his turnover and so begin to think in terms of reducing his percentage profit.

THE QUESTION OF INCENTIVE

By T. R. CAMERON, Assoc.M.Inst.Gas E.,
Deputy Manager, Galashiels Sub Group.

From a Presidential Address to the Scottish Junior Gas Association (Eastern District)

THE true strength of the juniors lies not so much in the total membership but in the part that attends and takes an active part in the proceedings and discussions. Every young entrant into the industry should become a member of a junior gas association.

Although an independent Association, we depend to a certain extent on the support we get from outside agencies. The Scottish Gas Board pays our travelling expenses and often provides, through the good offices of divisional and group chiefs, sustenance after some of our meetings. Our seniors put nothing in our way and have not at any time interfered with our arrangements or organisation. Nevertheless it is a pity that, when once a gas engineer crosses the imaginary line that separates the senior from the junior he ceases to take part in junior activities. There are a few worthy exceptions, whose continual interest and participation in our meetings have been invaluable to us.

It is the duty of both seniors and juniors, if they see any good in us, to encourage any new entrant into the industry to join us, and take an active part in our meetings.

No one will deny that our Association has an educational value. The nature of our syllabus and the possession of an experienced educational representative establish our claim. In this way the juniors can be of help to any students, especially those undertaking any of the examinations of the Institution. Members should take advantage of these facilities and any knotty problems can be taken up by your representative at the Scottish District Education Committee of the Institution of Gas Engineers.

Shortage of Trained Personnel

Our industry is in the dilemma of a shortage of trained and qualified personnel and the maintenance of a standard of proficiency which will ensure a modern, efficient, and progressive gas service. The Institution sets the standard that has to be achieved before one is a 'Chartered Gas Engineer.' Over the years, to keep pace with the greater complexities of gas practice, the standard has been raised, recently to the extent that it now takes seven years study at evening classes to reach the standard of Associate Membership. The examinations have been brought into line with those of the Institutions of Mechanical and Civil Engineers and so afford the opportunities to graduates of these other Institutions for smoother entry into our ranks, and make the qualifications of our own trainees less specialised and more acceptable to other industries.

By raising the standard of the Institution examinations a point could be reached where the difficulty of the test would mean that only very few would pass, a state of affairs that would make the shortage of qualified personnel more acute. The Scottish Gas Board is alive to this danger and facilities are now offered for further education of employees. These should be studied by all juniors who are in the throes of any approved course, for the assistance offered is an improvement on that of the past. The main facilities offered, after the fulfilment of reasonable requirements, are the reimbursement of all fees and travelling expenses, time off so that students can attend classes; and one day's leave with pay every week. All this is a great help to the budding gas engineer, and once facilities are granted they should be used to the full. The real benefit will come from the day's leave, as the most urgent concern of all students of evening classes is the constant fight against time to perform all the work the technical college imposes, and to strike a fair balance between his duty to his employer and his duty to himself.

Nevertheless the real crux of the problem lies in the interest, conditions, and incentives offered to those who make the gas industry their life's work. With a good reward in view the new entrant is not going to be thwarted by seven-year courses and the like. That the gas industry can offer interest is abundantly clear, but there are many of us who are doubtful whether the remuneration is such that the competition for posts will be as keen as it should be. There will be a shortage of trained personnel for a long time, and the industry will have to enter the open market and compete for its share of the national brain power.

The personal task of acquiring professional efficiency does not apply only to the gas engineer but is obligatory to all trades and professions. It is the duty of professional bodies and trade unions to promote the well being and status of their members; it is also their duty to give in return a guarantee that the individual standard of each member is at a satisfactory level. This means that these bodies have to concern themselves with improving the quality and outlook of their organisations.

The seeds of the present predicament were sown long ago and one can see the beginnings referred to in early addresses to the Institution. Between the years 1934 and 1938 the Gas Group of PEP (Political and Economic Planning) gave a considered view of the gas industry. I quote from its report on 'Personnel.'

'The need for improved personnel in all ranks of the industry has been stressed. In considering methods of improving the organisation and commercial activity of the industry it is easy to forget that personal efficiency throughout the industry is the first requisite, without which no success can be achieved. It must be remembered, too, that there is strong competition throughout British industry for good personnel, whether for the best type of skilled operative or for men capable of filling higher technical and administrative posts. It is of importance that the gas industry should not be poorly served owing to its own inattention to this important issue. There are two main aspects of this question: the recruitment and training of staff; and reorganisation of the industry to enable it to employ and obtain full value from specialists or highly qualified staff. The two are interdependent.

'The training of technical and sales staff is a matter which demands some change in organisation, since small undertakings are unable to train fully on their own account. At present large undertakings may have their own training schemes, and if a considerable measure of grouping is achieved, the group might be in a position to undertake training where at present the small constituent units cannot. Further, if there were a very considerable co-ordination of technical policy over large regions, it might be possible to establish regional training schemes.

Three Immediate Needs

'Measures for the recruitment of high-grade technical and administrative staff have been somewhat neglected by the gas industry. Close contact with schools and universities, the establishment of grants and scholarships, and more attention to the prestige of the industry among professional and technical bodies, are three immediate needs if improvement is to be achieved, and this is a subject which should be dealt with nationally. The success of recruiting will eventually depend on the prospects offered by the industry . . . . There are many places where gas engineers are called upon to perform highly skilled and responsible work for salaries quite disproportionate to their abilities and the cost of their training.'

This theme is reiterated in the Heyworth Report, and having in mind wage changes and other factors following the war the findings of the PEP Report are still relevant. Why young people take up jobs is a complex question and some research is being done in other industries. Some hard thinking is required on the subject of personnel, and it may be that research is required in the gas industry on what makes our profession appealing (or otherwise) to the youth school leaving or the university graduate. The effects of any new measures to increase the numbers of qualified personnel will not be felt for a good many years, and, conversely, any shortage being suffered at present is the result not only of the war or any lack of appreciation of the problem, but largely to the absence of any national authority within our industry to launch a co-ordinated effort to tackle the problem. With nationalisation the problem is now tackled on a broad front and there is no doubt where the Gas Act lays the responsibility. Unfortunately the industry is being faced with vast problems in considering methods of adjusting and improving the organisation and commercial activity, and personal efficiency may not be given the place it deserves.

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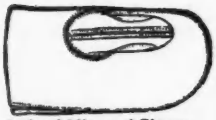

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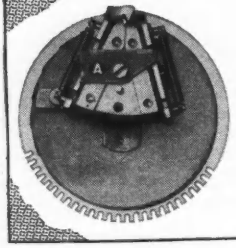


Fig. 1, on left, shows the back of the range-plate adjusted for optional coin. The swinging plate 'A' defies any attempt to insert a coin when one is already in the other slot.

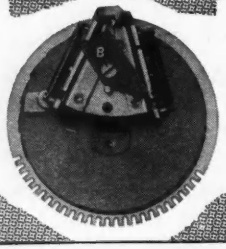
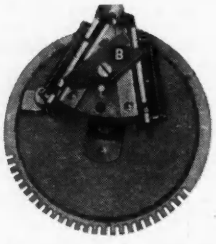


Fig. 2, on left, shows the plate positioned to admit sixpences only. To make this adjustment, loosen screw 'B' and tighten it again with the plate in the new position.



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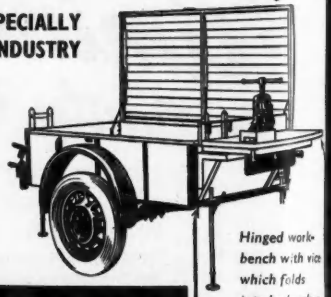

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Red, blue or black ? Distinctive colours for different fire risks prevent costly errors. Are your extinguishers the right colours ? Write, or phone Elland 2852, for free advice.

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In Every Ship of the Royal Navy

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THE COOKER CLEANER

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RUBBER MOPS

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(NEW "KLEENOFF" PRODUCT)

* *For resale to the public, and in bulk for Works use*

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OXIDE

DUTCH AND DANISH BOG ORE
SPECIALLY ACTIVATED OXIDE OF IRON

Oxide supplied on loan or sale outright.
Highest prices paid for Spent Oxide.

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GAS PURIFICATION & CHEMICAL COMPANY LIMITED

ESTABLISHED 1873

PALMERSTON HOUSE, OLD BROAD STREET, LONDON, E.C.2.

Telegrams: "Purification, Stock, London." Telephone. London Wall 5077

APPOINTMENTS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.

J. H. ROBINSON & CO. (LIVERPOOL), LTD., Mill Lane, Old Swan, Liverpool, 13, invite applications for the position of TECHNICAL SALES ENGINEER, Water Heater Department. Applicants should state age, education, qualifications, full particulars of previous experience, and salary required.

NORTH WESTERN GAS BOARD

MANCHESTER GROUP
CARBONISING ASSISTANTS—
STRETFORD WORKS

APPLICATIONS are invited for the above pensionable appointments at salaries within Grade A.P.T. VI (£490-£570 per annum).

Applicants must have had experience in the maintenance, operation and efficient working of all types of carbonising plant and they will be expected to carry out their duties under the direction of the Carbonising Superintendent.

Detailed applications, giving the names of two referees, should reach the General Manager, North Western Gas Board (Manchester Group), Town Hall, Manchester, 2, within twelve days. Envelopes should be endorsed 'Carbonising Assistants'.

EAST MIDLANDS GAS BOARD

SHEFFIELD AND ROTHERHAM DIVISION

ASSISTANT DIVISIONAL MAINS ENGINEER

APPLICATIONS are invited for the position of ASSISTANT DIVISIONAL MAINS ENGINEER who will be centred on Sheffield.

Applicants should have had considerable practical experience of Mains and Service laying and have thorough knowledge of the planning and design of all types of Distribution projects. They should be Corporate Members of the Institution of Gas Engineers or possess an equivalent qualification.

The salary will be in accordance with Grades A.P.T. IX or X of the National Salary Scales for Gas Staffs up to a maximum of £745 per annum and the initial placing will be dependent upon the qualifications, experience and ability of the applicant. A house will be made available at a reasonable rental.

The post is superannuable and the successful applicant may be required to pass a medical examination.

Applications, stating age, qualifications, and giving details of experience, together with the names of two referees, should be addressed to reach the undersigned not later than December 29, 1952.

C. C. WOOD,
Divisional General Manager.

Gas Offices,
Commercial Street
Sheffield, 1.
December 5, 1952.

EASTERN GAS BOARD

NORWICH DIVISION
DRAUGHTSMAN—NORWICH DISTRICT

APPLICATIONS for the above position are invited from suitably qualified persons, preferably between the ages of 25 and 35.

Candidates should have sound engineering drawing office training, and previous experience with a Gas Undertaking would be an advantage. The work would primarily be in connection with mainlaying and distribution projects.

The salary will be within Grade A.P.T. V (£460-£540 a year), and the successful candidate will be required to join the Board's Pension Scheme and to pass a medical examination.

Applications, stating age, training, qualifications and experience, together with the names of two referees, should reach the undersigned within fourteen days.

J. V. KNIGHT,
Manager.

Norwich Group,
Eastern Gas Board,
Bishop Bridge,
Norwich.

SCOTTISH GAS BOARD

DUNDEE GROUP
DUNDEE UNDERTAKING

APPLICATIONS are invited from suitably qualified persons for the appointment of SENIOR TECHNICAL ASSISTANT. Applicants require to have experience in maintenance and development of all Gas Works Plant, district holder and governor stations and design of works layout. Salary scale :—Grade X (Provincial A) (from January 1, 1953, £665-£765 per annum) with placing according to qualifications and experience. Candidates should possess the Higher National Certificate or appropriate equivalent qualifications of the Institution of Gas, Civil, Mechanical and/or Structural Engineers.

Applications giving the names of two referees, stating age, education, training, qualifications and experience and whether present post is superannuated, should reach the undersigned within 14 days of publication of this advertisement.

W. S. JOHNSTON,
Group Manager.

Gas Works,
50 East Dock Street,
Dundee.

SOUTH WESTERN GAS BOARD

SWINDON SUB-DIVISION
DRAUGHTSMAN

APPLICATIONS are invited from suitably qualified persons for the above position.

The duties are to assist the Production Engineer in the design and lay-out of plant, the preparation of specifications and control of Contractors.

Applicants should have had a good drawing office training and it would be an advantage to possess Gas Engineering qualifications and/or hold the Higher National Certificate in Mechanical Engineering.

The salary offered will be within Grade A.P.T. VII (£545-£625).

The successful candidate will be required to pass a medical examination and subscribe to any Superannuation Scheme which the Board may introduce.

Applications stating age, training and experience, together with the names of two referees, should reach the undersigned not later than December 22, 1952.

W. B. CLARIDGE,
Manager.

Gas Offices, Chapel Street,
Swindon, Wilts.

SOUTH WESTERN GAS BOARD

CHELTENHAM SUB-DIVISION
EVESHAM UNDERTAKING
ENGINEER AND DISTRICT OFFICER

APPLICATIONS are invited from Corporate Members of the Institution of Gas Engineers, for the position of ENGINEER and DISTRICT OFFICER at the above Undertaking.

Applicants should be conversant with the operation, manufacture and control of normal Gas Works plant, including machine charged Horizontal Retorts. The duties will include the distribution of gas and consumer service, and the experience and knowledge of these will be taken into account when making the appointment.

The salary will be in accordance with Grade A.P.T. XI.B. (£675-£800).

The successful Candidate will be required to undergo a medical examination and contribute to the Board's Pension Scheme.

Applications, stating age, qualifications, experience, together with the names of two Referees, should reach the Undersigned not later than December 31, 1952.

A. L. MORRIS,
Manager.

Cheltenham Sub-Division,
South Western Gas Board,
North Street,
Cheltenham.

SOUTH WESTERN GAS BOARD

APPOINTMENT OF
INDUSTRIAL GAS ENGINEER

APPLICATIONS are invited for the above position in the Bath Sub-Division, from suitably qualified persons.

The salary offered for the post is in accordance with A.P.T. X, £665-£765 per annum.

Candidates must have a sound knowledge of combustion and utilization of Industrial and Commercial Gas, particularly as applied to Light Industry, and must be prepared to travel throughout the area of the Sub-Division to carry out Industrial surveys, etc.

The successful applicant may be required to pass a medical examination and to contribute to the Board's Superannuation Scheme.

Applications, stating age, qualifications and experience, together with details of present and previous appointments, and the names and addresses of two persons to whom reference can be made, should be received by the undersigned not later than January 1, 1953.

C. P. BATEMAN,
Sub-Divisional Manager.

Bath Sub-Division,
South Western Gas Board,
18/19, Old Bond Street,
Bath.
December 10, 1952.

NORTHERN GAS BOARD

MIDDLESBROUGH DIVISION
CHIEF RENTALS CLERK

APPLICATIONS are invited for the appointment of a CHIEF RENTALS CLERK in the Divisional Office. Applicants must have had experience of keyboard machines on both ordinary and prepayment rentals and a knowledge of punch card equipment would be advantageous.

Salary A.P.T. VIII (£585-£665).

The appointment will be subject to a medical examination and to participation in the Board's Superannuation Scheme.

Applications stating age, qualifications and experience, together with the names of two referees should be addressed to the undersigned at the Northern Gas Board, Commercial Street, Middlesbrough, on or before January 2, 1953.

JOHN W. PALLISTER,
Divisional General Manager.

MISCELLANEOUS

W. C. HOLMES & Co., Ltd., have ERECTORS available at short notice for the installation or repair of Gas Works plant.

Work can be carried out on a contract or daywork basis as required.

Structural Steel Erectors are also available.

W. C. Holmes & Co., Ltd., Turnbridge, Huddersfield.

Telephones: Huddersfield 5280.
London, Victoria 9971.
Birmingham, Midland 6830.

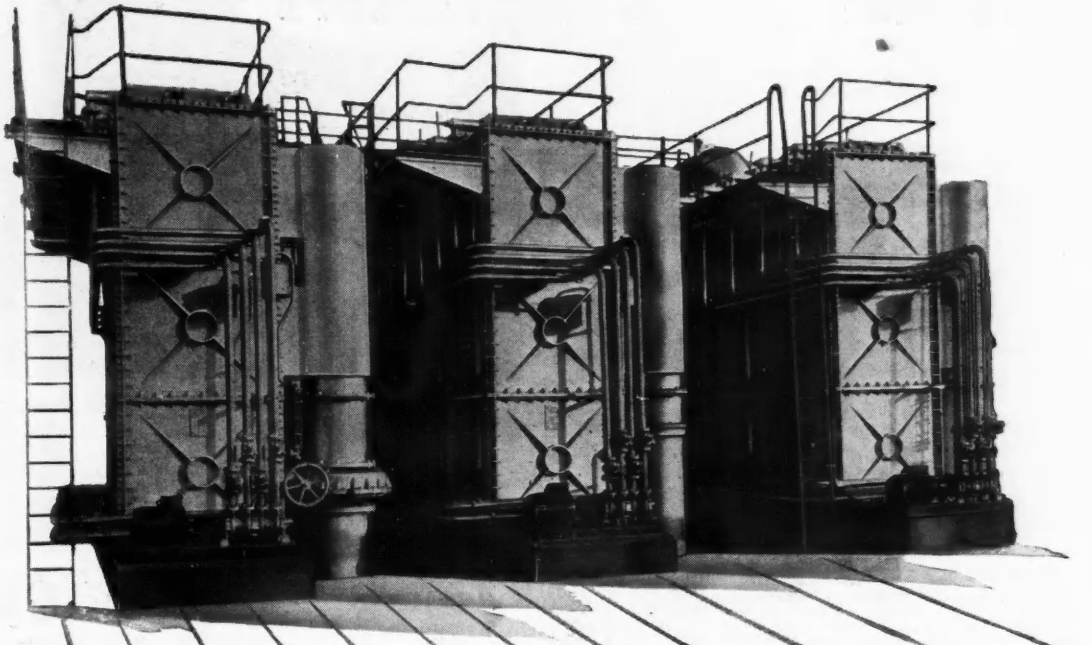
PATENTS

KINGS PATENT AGENCY, LTD.
(Director: B. T. King, A.I.M.E., Patent Agent.)
Advice, Handbook, and Consultations free. 146a, Queen Victoria Street, London, E.C.4. 'Phone: City 6161.

PLANT FOR SALE & WANTED

FOR SALE :—One Vertical GAS COMPRESSOR (only been in commission 100 hours) 4500 C.F.M. Reavell type V2/9E, direct-coupled, 10 lb. press., complete with bedplate and 300 h.p. motor, 290 r.p.m., 440 volts, 3-phase, 50 cycles, with Allen-West starter. No. 129, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

WANTED :—REGULAR SCRAP GAS METERS AND PARTS. Best prices paid. Offers to :—Mitcham Smelters Ltd., Red House Road, Croydon, Surrey. *Tel.*: THOrnton Heath 6101 (Private Branch Exchange).



A BATTERY OF MULTIFILM WASHERS

for Ammonia, capacity 15 million cu. ft. per day

installed at the Garston Works, Liverpool, for the North Western Gas Board. Other units at Garston include, Vacuum Benzol Recovery and Desulphurising Plant, Naphthalene Washing Plant, three Holmes-Connersville Meters, and three Holmes-Connersville Exhausters.

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C407

industrial gas compressors

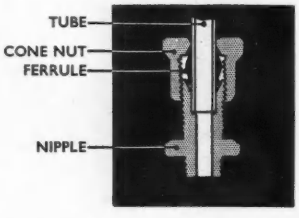
FOR COMPRESSING AIR OR GAS SUPPLIES USED FOR FURNACE HEATING, METAL MELTING, BRAZING, SOLDERING BITS, LAUNDRY IRONS, ETC.

DIRECT COUPLED COMPRESSORS (see illustration right) are fitted with automatic internal by-pass valves and lubrication systems. They are direct coupled to Keith Blackman motors. Type OA compressors in this range occupy a floor space of only 18" x 7½".
CAPACITY RANGE: 100 to 750 cub. ft. of gas or air per hour at 3 lbs. per sq. in. pressure.

TYPE 4 COMPRESSORS (not illustrated) are also fitted with automatic internal by-pass valves and lubricators. The complete unit includes motor and drive on a common bedplate, all of Keith Blackman manufacture.
CAPACITY RANGE: 500 to 20,000 cub. ft. of gas or air per hour at 3-5 lbs. per sq. in. pressure.
AREA OCCUPIED: from 9¼" x 16½" to 61" x 27".

DID YOU KNOW?

KEITH BLACKMAN have been making compression joints for many years and the present design embodies features developed as a result of this long experience. Notice that the shape of the ferrule is such that the joint is made without unduly stressing the tube.



Keith Blackman LIMITED
MILL MEAD ROAD, TOTTENHAM, LONDON, N.17.
'Phone: Tottenham 4522 (twelve lines) 'Grams: "Keithblac, Norphone, London."
BRANCH OFFICES AT MANCHESTER, BIRMINGHAM, LEEDS, GLASGOW, NEWCASTLE-ON-TYNE, PENARTH near CARDIFF, AND BELFAST

serving to burn

Note: the four burner heads (right) are for high pressure gas, or low pressure gas and air blast.

LEFT: "Fishtail" type burner with two-armed stamped pattern injector for heating liquid in tanks by submerged combustion tubes. For use with low pressure gas supplies. **Size Range:** 1", 1¼", 1½", 2" and 2½" outlets. **Capacity Range:** 45-280 cub. ft. of gas per hour.

Brass non-blow-off head types: deal with 5 to 10 cub. ft. of gas per hour.

Stainless steel, "F" type head, burner: deals with 8 cub. ft. of gas per hour.

Perforated head type burner: deals with 10 to 15 cub. ft. of gas per hour.

INDUSTRIAL GAS EQUIPMENT

524/2/GI

MILNE'S METERS LTD, EDINBURGH & LEEDS

Printed by Straker Brothers Ltd., E.C.2, for Walter King Limited, 11, Bolt Court, Fleet Street, London, E.C.4. Wednesday, December 17, 1952

What's in a Name..?

In this case something worth noting. Continuous research, carried out on our own full-scale gas works; testing gas-making coals, studying problems of retort and setting construction, checking materials used on Glover-West installations, designing new equipment to increase retort house efficiency. A progressive approach to the job of producing efficient carbonisation plant. We are not static. Our aim, in a word, is improvement.

West's Gas

IMPROVEMENT COMPANY LIMITED

ALBION IRONWORKS · MILES PLATTING · MANCHESTER 10

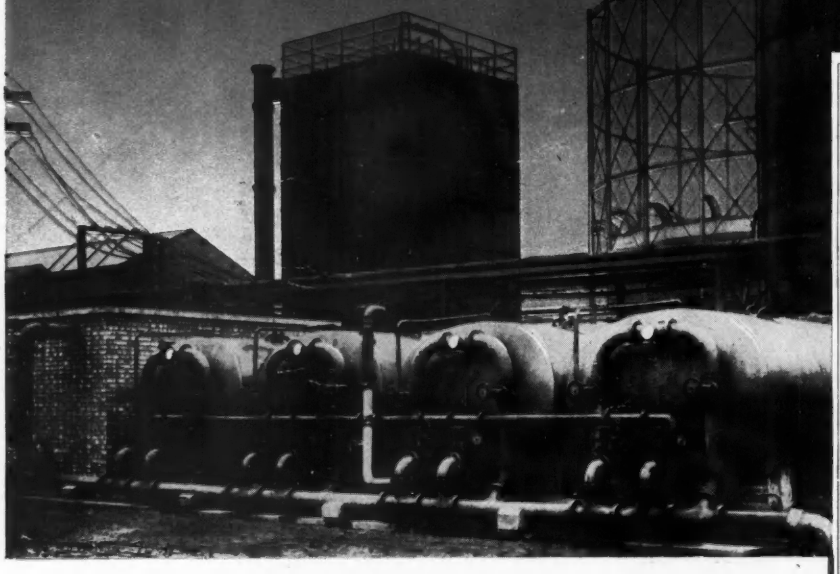
Telephone: COLlyhurst 2961 Telegrams: Stoker, Manchester

London Office: Columbia House, Aldwych, W.C.2. Telephone: HOLborn 4108-9 Telegrams: Wesgasco, Estrand

R 1

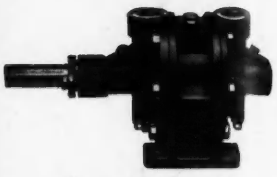
Pulsometer

PUMPS AND FILTERS

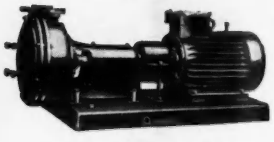


Filtration Plant in Gasworks

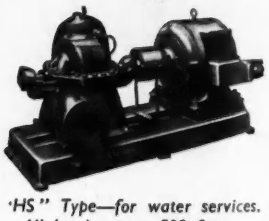
The illustrations show centrifugal pumps for light and heavy oil and liquor duties, stoneware and special metal pumps for handling acids and alkalis, pumps for circulating and washer duties, for clean water and fire services and for liquids containing abrasives.



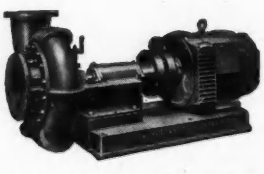
Rotary pump for Oil transfer duties.



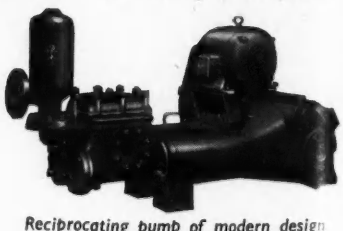
Stoneware pump for Corrosive and chemicals.



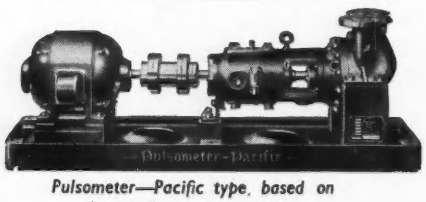
"HS" Type—for water services. All heads up to 500 feet.



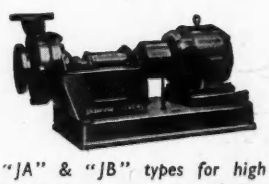
Slurry pump for coal washing and abrasive liquids.



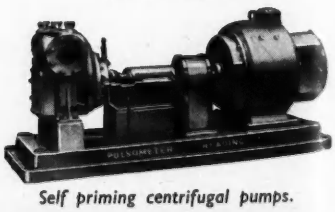
Reciprocating pump of modern design for Gas Works.



Pulsometer—Pacific type, based on latest American practice.



"JA" & "JB" types for high temperature water circulation.



Self priming centrifugal pumps.

PULSOMETER ENGINEERING Co. Ltd., Nine Elms Ironworks, READING